University of Alberta

Quality Management and Complaints Handling in an Electrical Utility

by

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Glossary of Abbreviations and Terminology

CEA - Canadian Electricity Association: Industry group for Canadian electrical utilities.

CH - Complaints Handling: A process to address customer complaints and provide a suitable resolution. Also, feedback from complaints is to be used to improve organisational processes.

CHS - Complaints Handling System: A set of inter-linked processes for the management of complaints handling within an organisation.

CS - Customer Satisfaction: Agreeable state of mind of a customer when the requested product or service is delivered.

CSU - Case Study Utility: A Canadian electrical utility and research sponsor for this project.

CSP - Corporate Strategic Plan: An annual plan outlining an organisation's vision, mission, operating principles, and goals and measures.

EMS – Environmental Management System: A set of inter-linked processes for the management of environmental aspects within an organisation.

IMS - Integrated Management System: The combination of different aspects of different management systems, for example quality and complaints handling, into one unified system, capitalising on synergies and eliminating redundancies.

ISO - International Organisation for Standardisation: The body for the administration and development of internationally accepted standards.

PR – Press Release

QM - Quality Management: The process through which quality aspects in an organisation are directed.

QMS - Quality Management System: A set of inter-linked processes for the management of quality aspects within an organisation.

TC – Technical Committee

TMM – ISO 9001:2000 Top Management Model: A model, based on the ISO 9001:2000 quality management standard, to assist top management in establishing and maintaining a quality management system.

WD – Working Draft

1. Introduction

Electrical utilities are interesting enterprises. Typically large and expansive, they are responsible for delivering a service vital to the everyday activities of individuals throughout the world. Along with this responsibility however comes pressure to continually deliver excellent service, which can be assisted through quality management (QM) and supported by effective complaints handling (CH).

1.1 Quality Management

A prevalent issue in the electrical utility industry is the chronic refrain of imbalance between the supply and demand of electricity. Compounding this situation is the perishable aspect of electricity - it needs to be consumed immediately. Also, utilities deriving electricity from water are hostage to water levels and a drought could have a devastating effect on an electrical utility's generation capacity and profit margins, regardless of the effectiveness of its management team. Especially following the black out of August 14, 2003, which affected parts of Ontario and the north eastern United States, electrical utilities are seeing themselves in the unique situation of requesting customers to conserve electricity, which goes against the traditional sales philosophy of trying to sell as much product or service as possible. Therefore, these organisations are seeing QM as a way to assist them in providing electricity in the future through the establishment of effective and efficient operations.

QM in electrical utilities has typically followed a relatively informal approach. In general, utilities have focused on continuous improvement projects and total quality

management. One reason for the lack of formalisation can be attributed to the absence of industry competition, since utilities have traditionally operated as monopolies. However, the dawn of competition has arrived and some jurisdictions are allowing customers to choose their electricity provider. Providing customers with assurances that the utility has appropriate systems in place to provide quality service may be a requirement and definitely as asset in the new business environment.

ISO 9000, a QM standard, is an effective way of inherently providing customers with satisfactory products and services. Registration to this standard requires organisations to establish processes for top management to effectively promote and evaluate their quality management system (QMS) and also insists on establishing processes to ensure appropriate resources are available and deployed, proper design and operations are in place, and that the organisation measures and always improves.

The year 2000 saw the introduction of a new revision of the standard, ISO 9001, with supporting standards ISO 9000 and ISO 9004 which offer fundamentals on vocabulary and guidelines for performance improvement, respectively. An auditing standard, 19011, was also developed in 2002 and provides guidelines for the auditing of both quality and environmental management systems. Together, these standards are designed to assist organisations in standardising their quality practices and in turn business processes, which ultimately should lead to customer satisfaction (CS).

1.2 Complaints Handling

For electrical utilities, interruptions in service not only cause inconvenience but can jeopardise customer safety. Therefore, attending to customer complaints should be of utmost importance to ensure the requested service is maintained and always provided.

Complaining is generally attributed to dissatisfaction. How then can it be said that complaints handling (CH) assists in customer satisfaction? Complaints are in fact opportunities to restore customer satisfaction and improve the quality of products and services. Resolving complaints effectively makes customers happy, leaving them with the feeling that a wrong has been righted and generally builds confidence in the customer's perception of the organisation. Effective CH also capitalises on the customer feedback provided through complaints and uses this information to improve processes and in turn products and services.

Like QM, the discipline of CH is currently acquiring its own family of internationally accepted standards: ISO 10001/2/3. In fact, during the writing of this thesis, the first standard from the series, ISO 10002, was published and provides guidelines for CH within organisations. ISO 10001 and ISO 10003 are expected to be published in 2006 and provide guidelines for codes of conduct and CH by external parties, respectively. Many companies and countries already have formalised CH requirements. However, this is the first attempt to standardise this management practice worldwide.

1.3 Integrated Management Systems

As suggested, QM and CH are both contributors to CS. Therefore, with their objectives so closely linked, a perfect opportunity is provided to integrate these two management systems within an organisation.

There is indeed a growing interest in the integration of management systems (IMS). Different levels of integration are present within today's companies, ranging from merely integrating documentation to attempting to assimilate management activities across all functional areas. When developing standards, attention is being given to their structure and the opportunities for integration, which can be proven by comparing ISO 9001:2000 and ISO 10002:2004. Therefore, with the importance of QM and CH in electrical utilities defined, it will be interesting to see how these management systems can be integrated, capitalising on synergies to provide overall improved CS.

1.4 Organisation of the Thesis

The remainder of the thesis has been divided into six chapters. Chapter Two investigates the existing literature covering the topics of interest, namely the electrical utility industry, QM, IMS, and CH. This information serves as a background for the challenges presented and also provides validity for the innovation offered in subsequent chapters.

Chapter Three expands on the role of top management in QM and looks at how the ISO 9001:2000 QMS would apply. This chapter incorporates a model to assist top management in developing, implementing, assessing, and improving its QMS and it is shown how such a model could apply to an electrical utility.

With the ISO 9001:2000 top management model developed, Chapter Four focuses on the application of this model to a case study utility (CSU). This case study details an assessment of the CSU's QMS, compares this QMS with the ISO 9001:2000 top management model, and finally offers improvement suggestions to assist the CSU in complying with ISO 9001:2000.

Chapter Five takes a further look at the evolution of QM and investigates the handling of complaints in an electrical utility. The chapter first presents the new ISO 10000 series of standards and suggests a model for CH within an electrical utility through the application of ISO 10002:2004. Incorporated with this chapter are opportunities for the integration of QM and CH in an electrical utility.

In Chapter Six, the CH model developed in Chapter Five is applied in the CSU. Also included here are opportunities within the CSU to integrate QM and CH.

The thesis concludes with Chapter Seven. Here, the results and contributions of this research are summarised, limitations of research are presented, and possibilities for future work are offered.

2 Literature Survey

2.1 Introduction

Information pertaining to what has currently been done in the fields of QM and CH was collected to provide a foundation and justification for the original work of this thesis. Focus was given to electrical utilities and QM and CH activities currently being practised by this industry. The following specific topics were investigated:

- the intent of the ISO 9000 series of standards, in particular ISO 9001:2000, and the structure of a QMS,
- the management structure and quality practices in an electrical utility,
- the definition, approaches, benefits, and challenges of IMS, and
- the definition of CH and an introduction of the ISO 10000 set of standards.

2.2 ISO 9000 and Quality Management Systems

The ISO 9000 series of standards provides organisations with guidelines for developing quality processes leading to the establishment of a QMS. The following section details reasons and outcomes of ISO 9001:2000 registration and looks further at the 2000 version of the standard and the structure of a QMS in general. This version of the standard amalgamates ISO 9001/2/3(1994) into ISO 9001, and allows for requirement omissions, such as waiving product design requirements for a service organisation.

2.2.1 Reasons, Benefits, and Concerns of ISO 9000

The overwhelming driving force for ISO 9000 registration comes from external pressures such as customers or the parent organisation (Adanur and Allen, 1995; Douglas *et al.,* 2003). Other reasons include improved operational efficiency and for use as a marketing tool (Adanur and Allen, 1995; Corbett *et al.,* 2003; Tsim *et al.*, 2002). From a global standpoint, ISO 9000 registration is attractive since this standard spans all industries and is recognised worldwide (Adanur and Allen, 1995).

Whether companies voluntary pursue ISO 9000 or are forced into compliance, there are numerous associated benefits. Positives include a reduction in customer complaints, improved supplier quality, increased employee involvement, reduction of bad parts, increased productivity, and better marketing leverage (Adanur and Allen, 1995; Chan *et al.,* 1999). ISO 9000 compliance audits give customers confidence in the companies they are purchasing from (Goldstein, 2003). Also, financial analyses show ISO 9000 registered companies tend to perform better relative to their non-registered competitors (Corbett *et al.,* 2002; Rajan and Tamini, 2003).

With the implementation of any system there are associated costs and concerns. High administrative costs, training, registration fees, cultural and industry generalisation, and time and manpower for maintenance are potential problems (Douglas *et al.*, 2003). Misunderstanding the purpose of ISO 9000 and mainly using registration as a marketing is also noted in literature as an obstacle to implementation (Taylor, 1995).

Also, some financial analyses have shown little correlation between ISO 9000 registration and organisational performance (Singeis and van der Water, 2001).

2.2.2 Introduction to ISO 9001:2000

This new standard revision amalgamates the previous three versions of the standard, ISO 9001/2/3:1994 into ISO 9001:2000. The format of the ISO 9001:2000 standard itself is quite different, moving from a twenty item list of requirements to a section-based standard addressing management responsibility, resource management, product realisation, as well as measurement, analysis and improvement. Instead of merely affirming that your organisation is compliant with an itemised list of requirements, management uses a process approach to look at its inputs and outputs and their relationships. The standard also suggests applying Shewhart's Plan-Do-Check-Act (PDCA) cycle to each process to assist in improvement. Finally, there is more emphasis on top management, a term that is referred to frequently in ISO 9001:2000.

The benefits identified from ISO 9001:2000 are encouraging. West (2001) states the additional focus on top management and customers, the simplification of documentation, and the inclusion of continual improvement are beneficial. It is believed that ISO 9001:2000 registration is more adaptable and less rigid, making registration easier, more convenient, and less expensive (Fredrick 2002).

One article however, written by Larsen and Haversjo (2000), is not so favourable to ISO 9001:2000. An increased, and perhaps unmanageable, demand on management, less emphasis on and explanation of lower level processes, and the formalisation of

management activities which naturally tend to function informally are identified. West (2001) states the fear that auditors will still demand extensive documentation, even if it adds little value to business processes and that organisations may struggle to obtain the level of top management commitment required as challenges.

2.2.3 Quality Management System Functions

Stemming from the requirements of a QMS outlined in ISO 9001:2000, it is valuable to define the typical structure of a QMS. Willborn (1989) defines a QMS as "interrelated processes to achieve the goal of providing customers with acceptable (quality) products/services". With this in mind, he provides a list of quality functions that should exist in an organisation. The alignment of these tasks with the requirements of the ISO 9000 standard is a good baseline for the development of a QMS. Table 2-1 lists the main functional areas of an organisation and their associated quality responsibilities.

2.3 Quality Management Practices in Electrical Utilities

The electrical utility industry has been appearing frequently in news headlines recently. Concerns circulating include the ever-increasing stresses imposed on the electrical grid and its subsequent reliability, possible sources for new generation, and the effect that de-regulation is having on the industry. It is apparent that there are many challenges ahead for utility managers in their quest for delivering quality service to their customers.

2.3.1 Canada's Electrical Utility Structure

In Canada, the electrical utilities has traditionally operated as monopolies, with customers not having a choice who they purchase electricity from. Utilities have been publicly owned, either municipally, regionally or provincially. These organisations have also typically grown into large corporations, covering the entire realm of electrical services from generation to transmission and distribution.

Table 2-1: Quality Tasks
(adapted from Willborn 1989)

Function	Responsibilities
Top Management	- establishment of quality objectives and quality policy - initiation and supervision of quality program - audits for compliance and program effectiveness - provision of resources for implementation
Marketing	- market research/analysis of quality issues and competitors - determination of product specifications - advertising, promotion of quality of products/services - training of sales personnel and customer service
Design Engineering	- research of quality aspects/requirements of products/services - technical and quality specifications and resource requirements - standardisation of product/parts design - testing/verification of quality requirements - documentation of final design and initiation of design reviews
Production	- clarification of quality aspects of design - production, inspection, and test plan - technical/human resources and workmanship standards - handling/storing facilities requirements - conduction of test runs and assessment of process capability - production controls/inspections/analysis and corrective actions
Procurement	- verification of requisitions and quality of deliverables - selection/negotiation/assessment of qualified suppliers - product preservation during transportation, storage, handling
Human Resources	- determination of staff requirements/qualifications - preparation of job descriptions - provision of conditions conducive to good workmanship - training, education, motivation of personnel
Administration	- establishment of quality management information system - organisation of quality assurance function - co-ordination of quality program
Accounting & Finance	- establishment of quality cost accounting system and reports - conduction of quality benefit/cost and investment analyses
General Services	- secure safety of facilities and workplaces - assessment and control of environmental conditions
Quality Assurance	- preparation of quality assurance program, manual, test plans - initiation and co-ordination of quality improvement projects - verification of process capability - review and audit of quality program

The Canadian Electricity Association (CEA) acts as a national forum and voice of Canada's electricity business. The CEA suggests a business unit framework for

electrical utilities (Table 2-2). Management experts theorise that smaller businesses provide customers with better service (Berman *et al.*, 1997). Larger companies frequently apply this theory to their structure to build businesses within businesses which all report to the same top management.

Table 2-2: Electrical Utility Structure
(adapted from Canadian Electricity Association)

Business Unit	**Responsibilities**
Generation	- power generation, acquisition, sale - fuel procurement and management - production system operation and maintenance - power marketing and generate-versus-purchase decisions - by-product and waste from generation management - design, engineering, construction, modification of generating stations
Transmission	- transmission delivery systems - operation and maintenance of transmission systems - design, engineering, construction, modification of transmission systems
Distribution	- simulation of distribution system operation scenarios - operation and maintenance of distribution systems - design, engineering, construction, modification of distribution systems - power acquisition and sale
Customer Service	- market assessment activities - marketing program design and development - domestic sales force and advertising promotions - customer contact, including call centres - rates and pricing activities - construction and maintenance of Customer Information System - customer billing, payment, and adjustments, meter reading - customer profile maintenance
Corporate Services	- procurement and vendor relations - material handling and inventory control - human resources - financial and information management - strategic planning - corporate policies - legal support - external relations - provision of services such as labs, R&D, mail, security - strategies for forecasting, budgeting, business variance analysis

2.3.2 Introduction of Competition

The industry trend favours introducing competition through de-regulation. Private enterprises are allowed to invest in generation, transmission, and distribution systems and all participants in the electricity chain have a choice of providers. The theory behind de-regulation is that competition will bring down electricity prices and spur investment in new and more efficient electricity supply (Adams, 2004). In general, regions introducing competition have seen success in the areas of price reduction and investment (Adams, 2004). Unfortunately, privatisation has also encountered some problems, especially where government tried to control the industry through rate freezes, stifling new investment (Tedesco, 2004; Trebilock *et al.*, 2004).

2.3.3 Customer Satisfaction in Electrical Utilities

With the advent of competition, it is imperative that utilities understand what their customers want and are able to evaluate customer satisfaction levels (Hayes, 1998; Vavra, 1997). In some regions, incentives are even tied with customer satisfaction survey results (Smith, 2004). Unfortunately, as reported by Grimes (2004), a select group of employees of a U.S. utility tampered with the results of its employer's customer survey by altering the survey list from a random group of customers to one comprised of family and friends. The utility was forced to return millions of dollars it received based on positively slanted customer satisfaction survey results.

In J.D. Power and Associates' 2004 Electrical Utility Business Customer Satisfaction Study (PR Newswire, 16 March 2004), it reported six key factors contributing to CS: power quality and reliability, customer service, company image, billing and payment,

price and communications (PR Newswire, 16 March 2004). A study of consumers affected by the August 14, 2003 black-out showed a drop in consumer confidence levels, with 50% expecting another black-out within the next six months and 85% of respondents requesting more information about the electricity system's supply (Reuters,11 Feb. 2004).

A 2003 study performed in the United Kingdom in 2003, ten years following privatisation, found that 90% of customers are motivated to switch electricity suppliers based on prices, while the remaining 10% are driven by factors related to customer service (Davis, 2003). This survey also showed that this region's electrical utilities scored an average customer satisfaction score of 89%, up two percentage points from 2002's survey (Davis, 2003). In the U.S., a study relating customer satisfaction levels among fourteen industries found that electrical utilities performed above the average 1.92 out of 5, scoring 2.04 (American Gas, 2004).

Tied to customer satisfaction is the future supply of electricity. Some regions of North America are operating within a very tight buffer between supply and demand, while other regions have excess short-term generation capacity (Kuhn, 2003). However, economic upturns can quickly change supply and demand levels, leading to the need for flexible and renewable generation sources (Herbert, 2003; Kuhn, 2003). Tax incentives and research and development subsidies can assist utilities and research organisations in developing sustainable, long-term sources of electricity.

2.3.4 Quality Practices in Electrical Utilities

Electrical utilities have not typically pursued ISO 9000 registration, primarily due to the traditional lack of competition in the industry. Instead, utilities have focused on total quality management and quality improvement initiatives. One example of this approach is Florida Power and Light, which was awarded the Deming Prize in 1989, becoming the first non-Japanese company to accomplish this feat (Hudiburg, 1991).

With the advent of competition however, it is predicted that ISO 9001:2000 registration will become important to utilities. A search on www.worldpreferred.com revealed that some organisations in this industry are beginning to pursue ISO 9001:2000 registration for some of their operations. Canadian electrical utilities in the Ontario regions of London, Hamilton, Ottawa, Niagara Falls, Toronto, Mississauga, and Kitchener have all registered their meter services to ISO 9001:2000. Registering meter services to ISO 9001:2000 can be attributed to Measurement Canada requirements, who have established its own set of quality management guidelines which utilities must adhere to in order to fully service meters. Utilities failing to adhere to these requirements must use Measurement Canada services to verify and seal serviced meters, resulting in extra costs. Fortunately, Measurement Canada guidelines are aligned quite closely with ISO 9001:2000 and utilities require little effort to become ISO 9001:2000 compliant.

Hydro Quebec has also registered many of its operations, including meter services, hazardous waste handling, procurement, and distribution and transmission projects.

Ontario Power Generation Inc. has registered its Nanticoke generating station to ISO 9001:2000 and Atomic Energy of Canada Limited, a nuclear utility, has also achieved ISO 9001:2000 at its many sites throughout the province of Ontario.

So far however, company-wide ISO 9001:2000 initiatives in utilities are not prevalent in Canada or other regions of the world. On the other hand, ISO 14001: 1996, a guideline for environmental management systems (EMS), is widespread among electrical utilities in Canada and also globally. It is predicted however that more attention will fall on ISO 9001:2000 in electrical utilities in the near future. Taylor (2003) suggests ISO 9001:2000 as a tool to help utilities improve their customer billing processes. One example of this application can be found in Powergen, the U.K's second largest electrical company. This organisation successfully registered its sales processes to ISO 9001:2000 in May of 2003, becoming the first utility to do so.

It is interesting to note that utilities in other industries have begun to pursue ISO 9001:2000 registration. The City of Calgary Waterworks has registered its distribution and transmission operations to ISO 9001:2000. Chan *et al.* (1998) present a case study of the mass transit railway system (MTR) in Hong Kong. This enterprise has similar roots to an electrical utility, traditionally being a public utility. Privatisation in this industry is becoming popular and management decided that it would be advantageous to register to ISO 9001:2000.

2.4 Integrated Management Systems

Organisations are being bombarded with numerous management system standards, among them guidelines for quality, environment, occupational health and safety, and corporate social responsibility. In response to this, "a need has emerged to somehow integrate wasteful redundancies and possibly generate synergy effects" (Karapetrovic, 2002). A viable solution: IMS.

2.4.1 Integrated Management Systems Definition and Approach

Karapetrovic and Willborn (1998a) define integration as "linking two systems in a way that results in a loss of independence". Furthermore, they define a system as "a unified whole of independent processes that function harmoniously, using various resources, to achieve an objective", with the objective defining and driving the system. They go on to state that an IMS is a "system of systems".

The simplest integration is merging documentation, which is desirable for maintaining registration to numerous management system standards (Wilkinson and Dale, 2001). A next integration step is alignment of organisational core processes, objectives, and resources, creating an "all-in-one" system (Karapetrovic, 2002). Other researchers suggest a total quality approach (La Hay and Noble, 1998, Wilkinson and Dale, 1999, Wilkinson and Dale, 2001). With this approach integration is inherent, whereas traditional management is more functionally based, focusing on one area such as defect reduction.

Organisations have traditionally established a QMS, followed by systems for environmental and/or occupational health and safety management. Some organisations however, such as electrical utilities, have initially established an EMS and are faced with the unique situation of integrating quality practices into the management structure. This leads to a variety of integration sequences. One possibility suggested by Karapetrovic (2002) is to establish a common IMS core and then develop corresponding modules for management systems of interest.

As Castle (1996) states, there is no one correct way to manage since every organisation is unique. Researchers however are attempting to suggest a generic approach to integration that would be compatible with any organisation's management structure. Karapetrovic and Willborn (1998a) suggest a systems approach to IMS. This approach, represented in Figure 2-1, follows seven steps beginning with determining the desired output. Following that, the system is designed and resources are allocated and deployed. Once resources are in place, the system is implemented, the actual output is obtained, and this output is compared against the desired output.

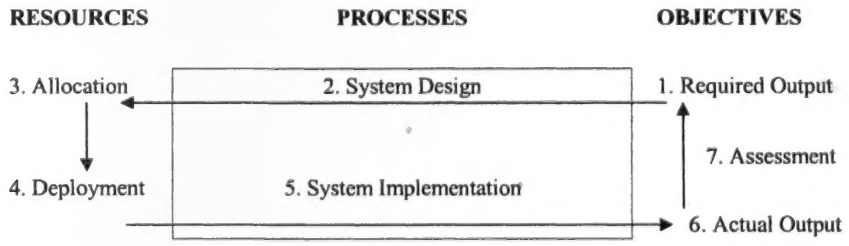

Figure 2-1: Systems Approach (Karapetrovic and Willborn 1998b)

Karapetrovic (2002) also advocates a two pronged approach to IMS. In the first prong, he suggests either integrating the organisation's standard requirements or merging common management system processes. Prong two looks at the integration of audits for all the systems involved in the IMS. Another vantage point suggests approaching integration with ingredients and a recipe in hand (Karapetrovic and Jonker, 2003). The ingredients are common elements of function-specific management system standards, such as policy, planning, implementation, operation, performance assessment, and improvement and management review. The recipe is the methodology used to implement an IMS, an example being the systems approach. Karapetrovic (2003) points out however that is it not feasible to develop a generic management system standard since this area is developing so rapidly.

Wilkinson and Dale (2001) provide a similar model to Karapetrovic and Willborn's system approach, also incorporating organisational culture. Another study by MacGregor Associates (Wilkinson and Dale, 1999) looks at integrating management system standards, suggesting a single top level management core standard with optional modules of supporting standards covering specific requirements.

2.4.2 Integration Benefits and Challenges

Karapetrovic and Willborn (1998a) present a list of IMS benefits including technology development and transfer improvements, joined operational performance, and internal management methods and cross-functional teamwork. Higher staff motivation, lower inter-functional conflicts, audit reduction and streamlining, enhanced customer confidence, and reduced costs are also benefits cited in the article.

As Karapetrovic and Willborn (1998a) state, "integrating systems has emerged as a major task for practicing managers and standards writers". Obviously then there are sufficient challenges to IMS, among them insufficient harmonisation of management system standards, different perceived stakeholders for each management system, and inter-functional conflict. Wilkinson and Dale (2001) further highlight differences in integration scope within an organisation and organisational culture as problems. Furthermore, it is believed that registration authorities responsible may not be willing to grant registration to a specific management system standard, such as ISO 9001:2000, based on the results from an IMS audit (Wilkinson and Dale, 2001). Also, managers need complex enough tools to help them realise the complexities, multiple viewpoints, and integration of the organisations in which they manage (Castle 1998).

2.5 Complaints Handling

The goal of any organisation should be to satisfy its customers. Unfortunately, "mistakes are an unavoidable feature of all human endeavour and thus also of service delivery" (Boshoff, 1997). Another reality of today's business is the malfunction of machines, which also results in errors and in turn dissatisfaction with products and services. Therefore not every customer will be satisfied all the time, leading to the necessity for CH to be a component of an organisation's management system. Customer satisfaction/dissatisfaction is a relatively new research area, emerging in the early 1970's (Lam and Dale, 1999). During this time, the majority of emphasis has been given to customer satisfaction, while dissatisfaction and CH has received

less attention (Lam and Dale, 1999). However, research on customer dissatisfaction does exist and the first attempt to standardise CH internationally is currently underway.

2.5.1 Definition of Complaints Handling

Complaints occur any time organisations fail to meet customer expectations (Dingemans, 1996). As Nyer (2000) states, "we do not want bad service nor do we expect it, so when firms let us down we are angry – complaining allows us to release those negative feelings and, we hope, get a resolution to or an apology for the cause of upset". Furthermore, studies show that customer expectations centre on service quality attributes such as employee behaviour, reliability of service, and the simplicity of information and design (Friman and Edvardsson, 2003).

With the realisation that complaints are an output of doing business, researchers have worked on definitions for complaints handling and complaints management. Dee *et al.* (2004) define CH as a "process that addresses issues that concern customers". Johnston (2001) further divides this process into receipt of complaint, investigation, settlement, prevention, and recovery of customers. Stichler and Schumacher (2003) describe CH as "fixing the situation directly with the customer". They also look at complaint management, defining it as "fixing the policies, systems, or protocols so that the problem would not occur for future customers". Expanding on complaints management, Johnston (2001) provides a list of factors assisting in good complaints management, among them are having clear procedures, providing a speedy and consistent response, having a single , easy to access point of contact for complainants,

employee empowerment to deal with complaints, having follow-up procedures to check with customers after resolution, using the data to engineer-out the problems, and using measures based on cause reduction rather than complaint volume reduction.

2.5.2 Importance of Complaints Handling

An organisation does not wish to have unhappy customers. Unhappy customers may take their business elsewhere and will also tend to tell between eight and ten others about their negative experience (Eccles and Durand, 1998). Unfortunately, complaints come with a negative connotation since customers are usually emotional, frustrated and perhaps even prone to exaggeration when they are driven to complain (Dingemans, 1996; Nyer, 2000). However, the receipt of complaints is an excellent opportunity for an organisation to restore customer confidence and to capitalise on this feedback for assistance in organisational improvements (Dingemans, 1996; Johnston, 2001). As Ramsey (2003) states, "each complaint is an opportunity to solve a problem, right a wrong, convert a sceptic or salvage a valuable customer relationship that is in jeopardy of being lost". It has also been found that only one out of ten unhappy customers complain, meaning there are still many disgruntled customers in the marketplace (Eccles and Durand, 1998). Organisations could benefit from establishing clear and more accessible channels for complaints, possibly resulting in fewer unhappy customers and also benefiting from increased feedback for improvement initiatives and prevention of further unsatisfactory products and services (Dingemans, 1996; Ovenden, 1995).

Of course of primary importance is how complaints affect organisational profitability. Customer retention has a direct impact on revenue since loyal customers continue to purchase, generate long term revenue streams, tend to buy more, and may be willing to pay more for products and services (Johnston, 2001; Stauss and Schoeler, 2004; Zairi, 2000). Also, it is much less expensive to keep a customer than to get a new one (Ovenden, 1995).

As detailed by Hallen and Latino (2003), Eastman Chemicals initiated a study of the effectiveness of their CH process. This organisation has an established CH process, but was finding that the volume of complaints was not decreasing over time. This statistic led them to believe that complaint feedback was not contributing to the improvement of internal processes, and in turn not improving the quality of their products. Eastman Chemicals also realised the cost of complaints, which include the potential for lost business, the cost of investigating complaints, and the claims paid and credits given as a part of complaint resolution. Investigation into the operation of their CH process proved that the root cause of complaints was not being uncovered, with investigation generally stopping when it was merely found who caused the problem. The organisation reacted to this discovery and instituted a formal complaint investigation process using logic trees, which graphically express cause and effect relationships that lead to an undesirable outcome. With the logic tree process in place, Eastman Chemicals tracked complaint progress on a monthly basis and nearly halved the number of complaints received during the period between 1997 and 2000.

Benefits realised from complaint reduction included improved CS, increased sales, reduced waste, and lower operating costs.

2.5.3 Complaint Satisfaction

It is not enough to merely have a CHS in place (Davidow, 2003; Estelami, 2000; Stauss and Schoeler, 2004). The system must be effective in providing complaint satisfaction. If a complaint is dealt with satisfactorily, the customer will tell five people. On the other hand, if the complaint is not resolved to the customer's satisfaction, it is likely that he or she will tell twelve people (Dingemans, 1996). Complaint satisfaction is therefore a necessary prerequisite for customer retention and problem solving (Stauss, 2002).

Stauss (2002) defines complaint satisfaction as "the satisfaction of a complainant with a company's response to his/her complaint". This article also states that customers who decide to complain have certain expectations as to how the company will respond and attempt to resolve their complaint. Researchers have also developed attributes that contribute to complaint satisfaction. Stauss (2002) in fact propose complaint satisfaction attributes, which include adequacy/fairness of the outcome, access to organisational contact points, friendliness, empathy, active feedback, and speed of response.

Stauss (2002) outlines a study performed with customers of a large German car manufacturer which evaluated the effect complaint satisfaction has on repurchase behaviour. The study looked at the satisfaction derived from the actual outcome of

the complaint as well as the process used to arrive at the complaint resolution. The study also measured the satisfaction customers had with their overall relationship with the car manufacturer, which is believed to contribute to repurchase intentions. Data analysis from this study arrived at two factors contributing to complaint satisfaction. The first factor, "cold fact", applies to the adequacy, speed, and reliability of complaint resolution and contributes greatest to overall complaint satisfaction. The second factor, "warm act", relates to friendliness and empathy and was found to influence the relationship customers feel to the organisation and in turn influences repurchase behaviour. Another study looked at the effectiveness of complaining through e-mail, a communication medium that is rising in popularity as of late (Strauss and Hill, 2001). This study measured complaint satisfaction and found the timeliness of complaint responses and the level of personalisation to be the main contributors to (or detractors from) complaint satisfaction (Strauss and Hill, 2001). It was also noted in this study that customers, primarily of university age, have a preference for e-mail because it is free, easy to use, and provides instantaneous access to organisations. Some organisations however, including ones involved in this study, struggle with managing e-mail responses. Organisations tend to be especially tripped up by ineffective automated e-mail routing systems and in sending out inappropriate automated consumer responses, which can unfortunately lead to complaint dissatisfaction (Strauss and Hill, 2001). One suggestion provided by Strauss and Hill (2001) was for organisations to send an immediate complaint acknowledgement and then to provide a more thorough, customised response when

the complaint has been fully investigated. This satisfies the timeliness of complaint response as well as personalising and providing an appropriate resolution.

2.5.4 Complaints Handling in Electrical Utilities

More specifically, CH can be related to the electrical utility industry. In a 2003 electrical utility study by Datamonitor (Davis, 2003), it was found that 42% of customers expect general inquiries to be resolved within 24 hours, while 39% of customers want resolution within 48 hours. Greater urgency related to inquiries involving technical problems. Another U.S. study performed by Navigant Consulting (Electrical Perspectives, 2004; Shaw, 2004) surveyed regulators in regards to implementing customer service quality standards. This study showed that it was generally accepted that new customer service standards do not need to be implemented, but interestingly the survey also noted that there is little uniformity in customer service, and in particular CH, while processes and customer complaints rates was a strong indicator of CS. Perhaps in the near future the industry will realise standardisation will assist in inherently delivering better CS.

2.5.5 ISO 10000 Series of Standards

The ISO 10000 series of standards relating to CS are currently being drafted by Sub-Committee 3 of ISO/TC 176. As Dee *et al.* (2004) state, "they are an attempt to distil international best practice codes of conduct, complaints handling and external dispute resolution. Their purpose is to provide benchmarks to help organisations and their customers do business in an increasingly borderless marketplace".

A standard relating to internal CH was originally suggested by ISO's Consumer Policy Committee (Dee *et al.,* 2004; ISO/PR 925, 2004). Upon reviewing this suggestion, the ISO Technical Management Board decided CH was related strongly to QM and mandated the alignment of the ISO 9000 and ISO 10000 series of standards (Dee *et al.,* 2004; ISO/PR 925, 2004).

The first standard in the series, ISO 10001 – *Quality Management: Customer Satisfaction – Guidelines for Codes of Conduct*, outlines codes of conduct for the prevention of complaints (Dee *et al.,* 2004). Its development was initiated in October 2003, with the first draft expected by the end of 2004. It is anticipated that ISO 10001 will be published and available to the global community by 2006. Currently, ISO 10001 is broken into sections prescribing code of conduct guidelines for establishing guiding principles, a code of conduct framework, development of codes, their implementation, and finally their maintenance and improvement (ISO/WD 10001, 2004).

ISO 10003 – *Quality Management: Customer Satisfaction – Guidelines for External Customer Dispute Resolution* provides guidelines for external bodies such as courts and government consumer protection agencies to participate in facilitative, advisory, and determinative processes (Dee *et al.,* 2004). This standard is being developed in parallel with ISO 10001, with the first draft expected by the end of 2004 and final publication slated for 2006. The structure of ISO 10003 will be very similar to ISO 10002, consisting of eight sections providing general guidelines and then more

specific guidelines for both organisations and external dispute service providers (ISO/WD 10003, 2004).

ISO 10002 – *Quality Management: Customer Satisfaction – Guidelines for Complaints Handling* started as ISO 10018, but was renamed and became part of the ISO 10002 triad in 2003 when CH was mandated to be aligned with QM. During the writing of this thesis, ISO 10002 was published and is now available to the global business community (ISO/PR 925, 2004). Several individual countries already have CH standards in place, so this standard will be a welcome addition to the global business environment (Dee *et al,*. 2004). "When the ISO 10002 complaints-handling process is implemented, the customer will benefit from responsive treatment of his or her complaint, while the organisation will benefit from the focus on problem areas pointing to opportunities for improvements and savings" (ISO/PR 925, 2004).

The ISO 10002 standard can be used on its own or integrated with other ISO 10000 standards or standards such as ISO 9001:2000 and ISO 14001:1996. In fact, integration of standards was on the mind of developers since it is easily adaptable to the process approach used in the ISO 9000 series or the PDCA structure deployed in the ISO 14000 series of standards for environmental management. The standard is structured in sections, much like ISO 9001:2000. Included in these sections is a set of guiding principles which covers such areas as visibility, accessibility, and responsiveness. Following that is a complaints handling framework criteria which outlines organisational commitment, customer focused complaints handling policy,

and the allocation of responsibility and authority. Other sections include planning and design of the system, system operation, and its maintenance and improvement (ISO 10002:2004). The standard concludes with appendices providing guidance material on such topics as data collection, audit procedures, fairness, remedies, and ongoing monitoring and risk assessment (ISO 10002:2004).

In summary, "ISO 10001, 10002 and 10003 will serve as valuable management tools, particularly benefiting consumer affairs and quality management professionals" (Dee *et al.*, 2004).

2.6 Motivation for the Proposed Research

Motivation for this research project is being led from two main directions: requests from the research sponsor and from academic opportunities made visible during the literature survey.

The research sponsor, a Canadian electrical utility, has interests primarily aligned with top management responsibilities, QM, and the application of ISO 9001:2000 to their organisation. The following items further structure what the research sponsor, further referred to as the Case Study Utility (CSU), hopes to obtain from this research project:

- The CSU's ISO 14001:1996 registered EMS system was initiated at the operational level and expanded upwards through the management hierarchy to encompass the whole corporation. However, the CSU is considering initiating the formalisation of the QMS at the top management

level and is therefore interested in an interpretation of top management responsibilities within a QMS.

- The CSU is requesting an assessment of its current, informal QMS and is interested in learning what work would be required in order to obtain ISO 9001:2000 registration. A driving force behind this is of course to improve quality of service, but the CSU also believes it may require ISO 9001:2000 registration to remain competitive in the future marketplace, as literature shows that de-regulation is becoming widespread. A QMS system will assist in not only delivering CS, but with also improve other criteria such as operational efficiency.

From an academic viewpoint, motivations have been recognised for three areas of research; QM, CH, and the integration of these two management systems in an electrical utility. In reference to QM, motivations are as follows:

- Literature critiquing ISO 9001:2000 suggests an increased focus on top management as compared to the 1994 revision. Therefore, it became apparent that an interpretation of ISO 9001:2000 for top management would be an important academic contribution.
- There is a lack of literature regarding QM, and in particular the practise of ISO 9001:2000 within the electrical utility industry. In fact, the list of Canadian electrical utilities with ISO 9001:2000 registration for even one component of their business is limited.

In regards to CH, the motivations for research are as follows:

- The publication of the first international CH standard, ISO 10002:2004. An application of this standard to the CSU will be one of the first performed and will be a good exercise for assessing the CSU's CHS as well as evaluating the standard itself.
- Literature validated the importance of CS in the electrical utility and also presented strong links between effective CH and CS.
- Unlike QM and IMS, there is no summary of literature related to CH and the management of customer dissatisfaction.

Motivations for the integration of QM and CH in an electrical utility include:

- Through literature and review of the ISO 9001:2000 and ISO 10002:2004 standards, it was shown that there are opportunities to integrate these standards. Both systems have similar objectives and process, which can be aligned and these systems can also share resources.
- Literature primarily focuses on the integration of quality and environmental management systems. Therefore, an integration of quality and CH provides an atypical integration scope. Both systems have similar objectives and process, which can be aligned and these systems can also share resources.

2.7 Objectives of the Proposed Research

Based on the background information collected and the motivations for research recognised, the following list illustrates the objectives proposed for this research project:

- Provide a comprehensive literature survey on the discipline of CH.
- Interpret the role of top management in a QMS and in particular the role it plays in ISO 9001:2000. In conjunction with this interpretation, develop a model to assist in implementing and assessing a top management level QMS in an electrical utility.
- Using the developed top management model, assess the current state of the CSU's QMS and suggest improvements to assist the CSU in obtaining ISO 9001:2000 registration.
- Provide an interpretation of the ISO 10000 family of standards and in particular look in depth at the newly published ISO 10002:2004 standard for CH in organisations.
- Discuss the application of ISO 10002:2004 to the CSU and develop suggestions to assist the CSU in complying with these guidelines.
- Prepare suggestions and a possible model for the integration of a QMS and CHS within an electrical utility and apply it to the CSU.

3 Top Management and ISO 9001:2000

3.1 Introduction

Top managers assume significant responsibility for the activities of their organisations. Following recent corporate scandals such as Enron, Worldcom, and Nortel, customers and stakeholders are demanding more visibility of and accountability for organisational activities. Therefore, top managers appear willing and are often required to implement standardised management systems such as ISO 9001:2000 to help with organisational credibility and also in turn to assist in operational performance. The following chapter will therefore present:

- the organisational viewpoint of top managers,
- how top management activities relate to ISO 9001:2000, and
- a proposed ISO 9001:2000 model for top management.

3.2 Top Management in an Organisation

ISO 9000:2000 defines top management as a "person or group of people who directs and controls an organisation at the highest level". Therefore, in most companies top managers see their organisation from a holistic perspective, concerned mainly with how the organisation functions overall. In comparison, middle managers are more functionally focused. For example, a purchasing manager is most interested in materials while the manager of a design engineering group focuses primarily on the design of a new product or process. It is also interesting to note that the organisational viewpoint at lower, operational levels is also holistic. Operators

assembling a product do not generally consider the procurement processes involved in obtaining the raw material or the process employed for designing the product. Instead they look at the overall product and manage their activities based on whether or not the product they produce meets the provided manufacturing specifications. Figure 3-1 further illustrates the viewpoint of managers at different organisational levels and gives examples of some typical middle management functions.

Figure 3-1: Managerial Viewpoints in Organisation

Figure 3-1 shows that top management activities cover a very large scope - essentially the organisation itself. Inherently it is not practical, or likely even possible, for top management to review all of an organisation's information. Therefore, systems have to be in place to merge or integrate information in order for top management to guide the organisation. With this challenge in mind, the next section will investigate top

management and in particular, how the ISO 9001:2000 guidelines apply at this level of an organisation.

3.3 ISO 9001:2000 Interpretation for Top Management

Following the process approach, inputs to top management processes are the requirements of customers and all other interested parties or stakeholders. These stakeholders include the board of directors and owners/shareholders of the company itself. The output is the requested product or service, accompanied by assurances that there is no unnecessary harm done to the environment and society in which the organisation operates. The process used is basically the organisation itself, which is typically guided by a business plan developed by top management. This organisation will consist of supporting processes such as operations, research and development, marketing, procurement, human resources, information technology, safety and environmental controls and of course quality activities. Following the execution of the business plan by the many facets of the organisation, top management has the responsibility of assessing the output. It needs to provide feedback if the product or service is not satisfactory and it also needs to develop new or evolving objectives to continually improve the products and services provided by the organisation. The block diagram in Figure 3-2 uses a feedback control system to illustrate, in a high level format, this overall top management process.

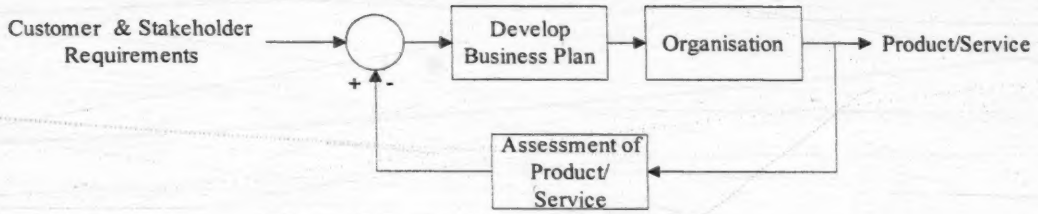

Figure 3-2: Top Management System

For an electrical utility, customer requirements relate to electricity demands. Stakeholders include regulatory bodies and the community in which the organisation operates. Therefore, attention must also be given to such issues as environmental protection, safety of employees and the community, and compliance with rigorous industry standards such electrical codes. The business plan developed by an electrical utility's top management generally looks at its present and future capacity to supply electricity and the processes of generating, transmitting, and distributing electricity. The output from the organisation is electricity, respecting the community and environment.

The challenge for interpreting the ISO 9001:2000 standard comes when PDCA is applied to the top management role. Essentially top management plans, checks, and acts while the do portion of the cycle is executed by functional groups within the organisation. Figure 3-3 further illustrates the relationship between the ISO 9001:2000 standard, the PDCA cycle, and also the systems approach developed by Karapetrovic and Willborn (Figure 2-1). The core of the figure represents the four main sections of ISO 9001:2000. The rings surrounding the core show how the PDCA cysle and the systems approach apply to each section of the standard. For example, ISO 9001:2000's resource management section aligns with the plan step of

the PDCA cycle and the resource allocation and deployment steps suggested by the systems approach. As is evident from Figure 3-3, the product realisation section of the standard is not a function that top management actively participates in, since top management mainly plans, checks, and acts. However, the upper level of the organisation must play a supporting role and the planning, checking, and acting it performs must be sufficient to allow the organisation to meet requirements and also facilitate continuous improvement.

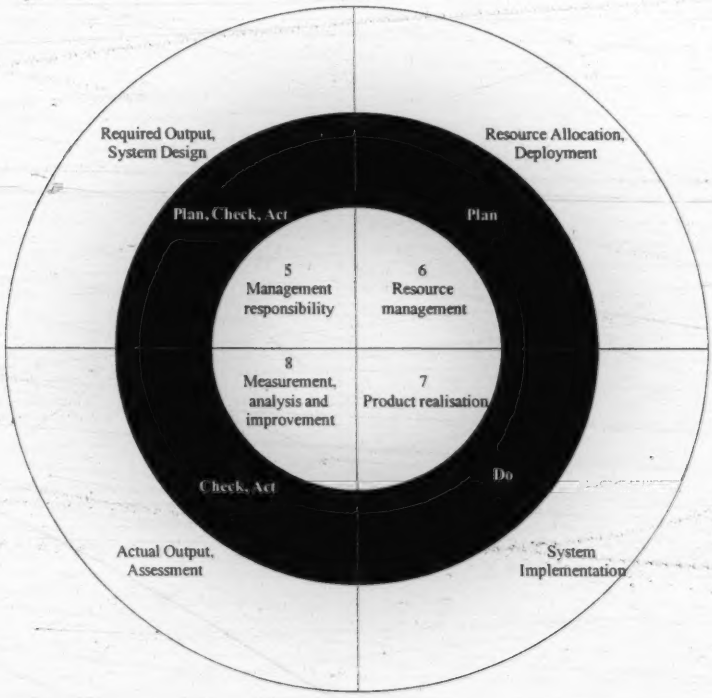

Figure 3-3: ISO 9001:2000, PDCA, and the System Approach Comparison

Not detailed within the standard but yet a very important function of top management is how to structure the organisation. Top management must give major consideration to what organisational structure will best serve its customers and stakeholders, since

no one formation will suit every organisation. Among other things, top management will need to consider customer requirements, corporate culture, and market demands. Once the organisational structure is defined, it is important to populate it with competent people. The ISO 9001:2000 standard recognises the importance of competent employees and in fact dedicates its sixth section to resource management. However, in the standard top management is only given clear responsibility for appointing a quality management representative. Considering that top management does not play an active role in product realisation, the standard should also emphasise the designation of middle-level managers that are aware of the organisation's objectives and are dedicated to providing customers with quality products and services.

The management responsibility section of ISO 9001: 2000 requires that top management perform regular reviews to ensure the organisation is meeting its objectives and is always striving to improve. In addition, ensuring the applicability and value of the criteria that management is reviewing against is important, especially since top management generally only reviews very high level information. A suggestion to address this issue would be to look a model for developing organisation-wide quality performance indicators. Two possible models are the balanced scorecard invented by Kaplan and Norton (1996) and Neely's (1998) performance prism methodology.

3.4 ISO 9001:2000 Top Management Model

Top management plays an important, yet unique role in ISO 9001:2000. As discussed in the motivation for research, the 2000 version of the standard seemingly emphasises top management responsibility, yet the business community has called for clarification of many of these requirements. This need for interpretation coupled with the top management focus requested by the CSU has led to the development of a tool for top management: the ISO 9001:2000 top management model (TMM).

The actions required to conform to QMS requirements are mainly implemented by middle, functionally based management. For example, requirements regarding purchasing would be fulfilled by the organisation's purchasing manager. Top management however must be sure that middle management is informed of the objectives and requirements of the quality program and also that clear and direct communication channels are established for regular QMS review and improvement.

In the TMM, managers for each functional area are responsible for ensuring their areas are QMS-compliant and that they feed this information to top management by the channel(s) chosen by the organisation. If each functional area complies with the requirements of the proposed model, the organisation as a whole should inherently be able to demonstrate compliance with ISO 9001:2000. It is true that the model presented involves not only top management, but also middle management. However, the model exists to assist top managers in knowing issues to look for from the different functional areas in order to guide and also ensure the organisation is

complying with ISO 9001:2000. The TMM is built upon two main guidelines: ISO 9001:2000 and the quality functions outlined in Table 2-1 (Willborn 1989).

The model is presented in a table, with the table's left column defining the functional areas found in an electrical utility or organisations in general. When considering the application of the TMM to a wide-range of organisations and industries, it is not realistic to assume every organisation will perform all of the functions listed in the model. Therefore, omissions may be justified based on the activities and objectives of the organisation. This corresponds with the guidelines outlined in clause *1.2 Application* of ISO 9001:2000 and its accompanying explanatory document (ISO/TC 176/SC 2/N 524R, 2004). These two sources state that standard requirement omissions are permitted if exclusion justifications can be provided. An example is the omission of operation-related requirements if the organisation is primarily a design company and outsources operational activities. The second column in the TMM table corresponds to the quality related responsibilities for each functional areas. Accompanying this list of responsibilities are the corresponding requirements of ISO 9001:2000, which are outlined in the third column of the TMM table.
The model was also developed with the ease of establishing and assessing a QMS in mind. For each functional area, the model guides management in developing quality practices and assessing compliance with QMS standards. Table 3-1 presents the TMM.

Table 3-1: ISO 9001:2000 TMM

Functional Area	Responsibilities	ISO 9001:2000 Reference
Top Management	Establishment/ maintenance of quality objectives	4, 5.1, 5.2, 5.4, 5.6
	Formulation/maintenance of quality policy	4, 5.1, 5.2, 5.3, 5.6
	Initiation/supervision of quality program	4.1, 5
	Appointment of management representative and appropriate area leaders	5.5
	Auditing for compliance	5.6, 8.2.2
	Provision of resources for implementation	5.5, 6.1
	Assessment and improvement of organisation	5.6, 8
Marketing & Customer Service	Establishment of processes & documentation	4, 5.4.2
	Administration of customer satisfaction survey and market research	5.2, 8.2.1
	Determination of product specifications	5.2, 7.2.1
	Advertising, promotion of products/services	5.2, 7.2.3
	Personnel training	6.2
	Customer service	5.2, 7.2.3
	Assessment and improvement of processes	8
Design Engineering	Establishment of processes & documentation	4, 5.4.2, 7.1
	Research of quality aspects/requirements	7.2.1, 7.2.2
	Technical detail development and planning	7.3.1, 7.3.2, 7.3.3
	Review, verification, and validation of design	7.3.4, 7.3.5, 7.3.6
	Control of design modifications/updates	4.2, 7.3.7
	Personnel training	6.2
	Determination of quality specifications and resource requirements	6.1, 7.4.2
	Assessment and improvement of processes	8
Operations	Establishment of processes & documentation, including production plans, inspection plans, test plans, identification and traceability	4, 5.4.2, 7.5.1, 7.5.2, 7.5.3
	Clarification/validation of design quality aspects	7.5.2
	Determination of technical/human resources	6
	Personnel training	6.2
	Product and customer property preservation	7.5.4, 7.5.5
	Assessment/establishment of process capability	8.1, 8.2.3, 8.2.4
	Control of monitoring and measuring devices	7.6
	Control of nonconforming product	8.3
	Assessment and improvement of processes	8

Table 3-1 ISO 9001:2000 TMM (Continued)

Functional Area	Responsibilities	ISO 9001:2000 Reference
Procurement	Establishment of processes & documentation	4, 5.4.2, 7.4.1
	Development of specifications to measure purchased product quality	7.4.2
	Clarification of requisitions	7.4.2, 7.4.3
	Selection/negotiation with qualified suppliers	7.4.2, 7.4.3
	Training of personnel	6.2, 7.4.2
	Verification of quality of deliverables	7.4.3
	Assessment/recording of supplier performance	7.4.3
	Product preservation	7.5.5
	Assessment and improvement of processes	8
Human Resources	Establishment of processes & documentation	4, 5.4.2
	Determination of staff requirements and qualifications	6.1, 6.2.2
	Preparation of job descriptions	6.2.2
	Provision of conditions conducive to good workmanship	6.3, 6.4
	Training, education, and motivation of personnel to achieve organisation's quality objectives	6.2.2
	Assessment and improvement of processes	8
Accounting & Finance	Establishment of processes & documentation	4, 5.4.2
	Provide guidance and control for available resources, budgets	6.1
	Training of personnel	6.2.2
	Assessment and improvement of processes	8
General Services	Establishment of processes & documentation	4, 5.4.2
	Secure safety of facilities and workplaces	6.3
	Assessment and control of environmental conditions	6.4
	Training of personnel	6.2.2
	Assessment and improvement of processes	8
QMS Admin.	Establishment of processes & documentation	4, 5.4.2
	Preparation and maintenance of quality manual	4.2.2
	Organisation and guidance of quality program	5.5.2, 5.5.3
	Initiation and coordination of quality improvement programs	8.5
	Review and audit of quality program	5.6, 8.2.2
	Assessment and improvement of processes	8

Comparing the TMM with the standard guidelines, it can be proven that all requirements have been addressed. Each requirement from sections four through

eight appear in the third column of the ISO 9001:2000 TMM. It can also be seen that certain requirements appear frequently among the different functional areas of the model. For example, each functional area of the organisation needs to establish and document its processes (plan) as well as constantly assess and improve (check and act). The responsibilities falling between these are the do activities for this functional area. This is demonstrated by the example shown in Figure 3-4, which shows the relationship between the TMM responsibilities for the human resources functional area and the PDCA cycle.

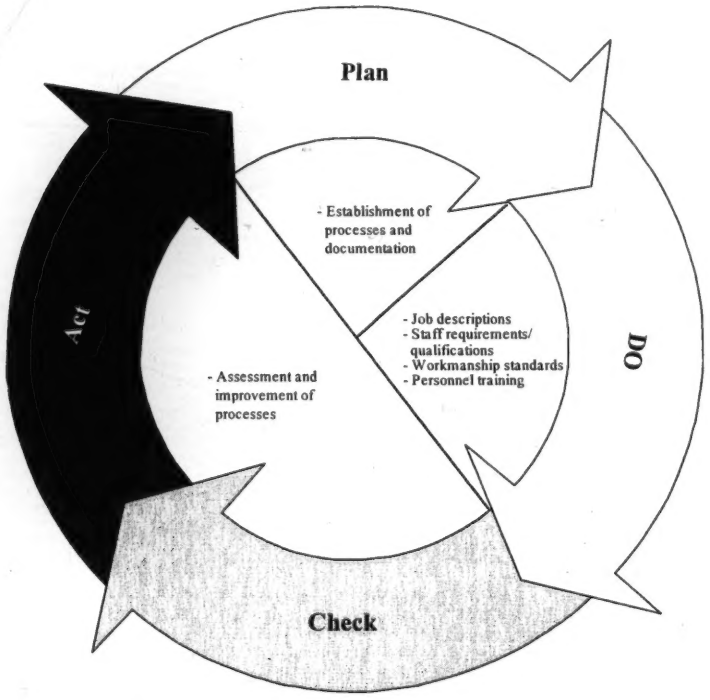

Figure 3-4: ISO 9001:2000 TMM and PDCA for Human Resources

3.5 TMM Relationship to an Electrical Utility

As mentioned previously, the main output of an electrical utility is electricity. For an electrical utility to provide such a service, it needs to generate, transmit, and distribute

electricity. Utilities also need supporting customer and corporate services. Figure 4-1 shows how electricity is generated, transmitted, and delivered. Definitions of the symbols used in this and subsequent figures can be found in Appendix C.

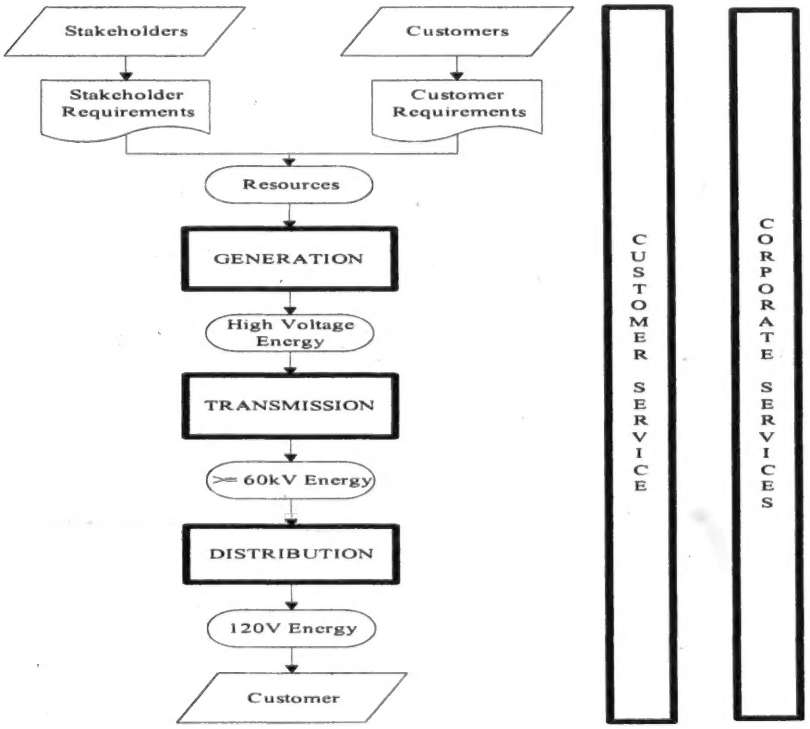

Figure 3-5: Electrical Utility Process for the Provision of Electricity

Electrical utilities are costly enterprises, requiring large amounts of physical infrastructure, and an abundance of resources. For such a large and complex organisation, it is imperative to have effective top management and this top management has to also be accountable to the shareholders and essentially all stakeholders of the utility. Besides providing QMS guidance, top managers need to establish appropriate performance indicators and assess these results against pre-specified targets. Quality performance indicators include retail rates, average service

interruption time and frequency, customer satisfaction levels, market share, employee accident frequency and severity, cost per customer, net revenue, and employee satisfaction levels. Table 3-2 continues looking at the TMM and relates its remaining eight functions to an electrical utility.

Table 3-2: ISO 9001:2000 Application to an Electrical Utility

ISO 9001:2000 TMM Functional Area	Electrical Utility
Marketing & Customer Service	Manage accounts, service issues, and provide a communication channel between the utility and customers
Design Engineering	Design of generation, and converter stations and systems for transmitting, and distributing electricity.
Operations	Operation and maintenance of generation stations and systems for transmitting and distributing electricity.
Procurement	Purchase of material for construction and maintenance of generation, transmission, and distribution systems as well as material for supporting administration processes.
Human Resources	Ensuring competent employees are available to meet the requirements of the organisation.
Accounting & Finance	Support the justification, tracking, and reporting of financial matters throughout the utility.
General Services	Supply and maintenance of buildings and information technology to support the operations of the utility.
QMS Administration	Administration of quality practices and support for ongoing improvement initiatives.

3.6 Summary

This chapter interpreted top management activities in electrical utility and related these activities to ISO 9001:2000 requirements. Also included in this chapter was a model for top management to assist in establishing and maintaining an ISO 9001:2000 compliant QMS. This model also showed the support needed from middle management to operate an effective QMS. With this model now developed, the next chapter will look at its application to the CSU.

4 ISO 9001:2000 Case Study: An Electrical Utility

4.1 Introduction

Receiving sponsorship from an electrical utility has provided a unique research opportunity. Electrical utilities have not traditionally pursued ISO 9000 registration, yet are typically quite extensive and diverse organisations. Therefore, the case study provides a good example of how large corporations are managed and also give a fresh viewpoint for implementing ISO 9001:2000. The following chapter details:

- the background of the CSU,
- the application of TMM to the CSU, and
- a gap analysis of the CSU's QMS against ISO 9001:2000.

4.2 Case Study Utility Background

The organisation being studied is a large Canadian electrical utility operating in a monopoly market, with the majority of its electricity derived from water. Figure 4-2 shows the corporate organisational chart, which is divided into business units comparable with the CEA guidelines shown in Table 2-1. Under each business unit resides divisions, with each division further broken down into departments and subsequently sections.

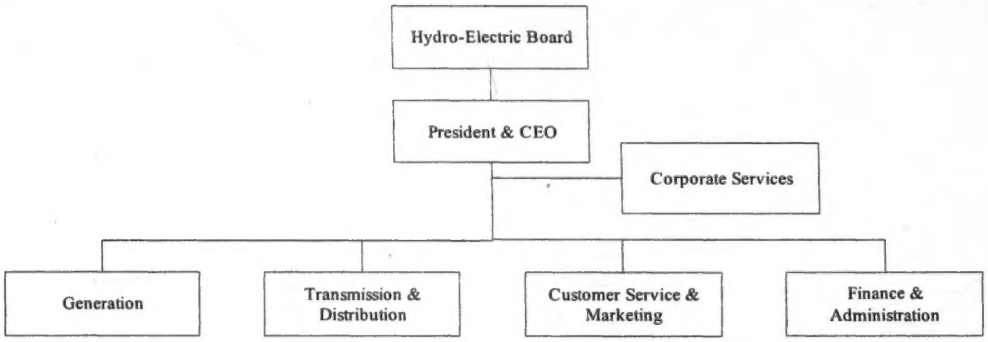

Figure 4-1: Case Study Utility Corporate Structure

The CSU is built on a strong management foundation and has developed a favourable national reputation. In fact, this organisation habitually ranks among the top electrical utilities in CEA's annual customer satisfaction survey. Another indicator of success is that the CSU consistently provides its customers with among the lowest average retail electricity rates in North America, with much of the low cost benefits realised from export to neighbouring jurisdictions. In regards to its management practices, the CSU has formalised systems in place for such functions as environment and safety. QM however has not typically followed a structured path, although many elements of a QMS are evident throughout the CSU. The following investigation will endeavour to define the current status of the CSU's QMS and offer suggestions for ISO 9001:2000 compliance should the utility need or desire registration in the future.

4.3 QMS Case Study Process

Formalising management systems starting with top management is a new approach for the CSU. For example, its ISO 14001:1996 based EMS was first established at the operational level. The CSU's generating stations began achieving ISO

14001:1996 registration in 2001 and the EMS has since expanded to encompass the entire organisation. Figure 4-2 shows the steps performed in the CSU's QMS study.

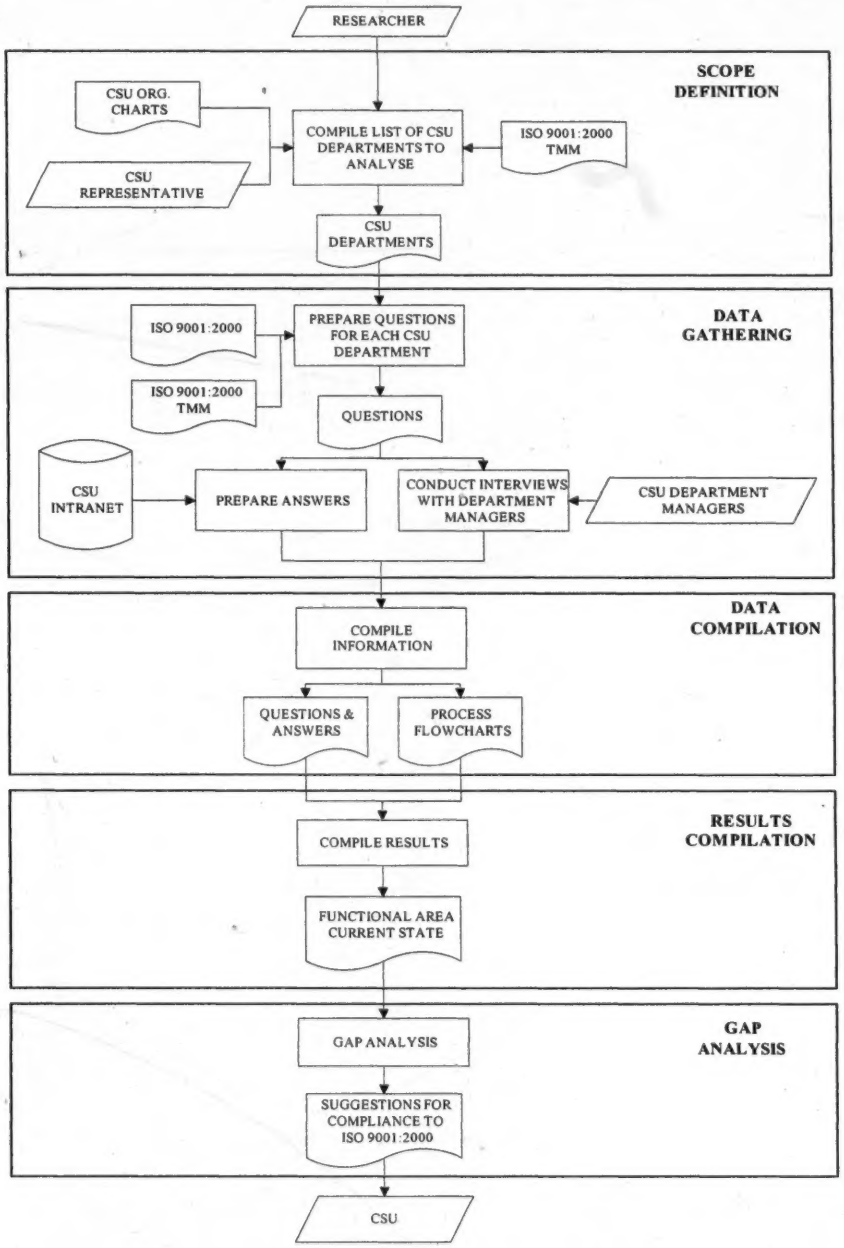

Figure 4-2: QMS Case Study Process

4.3.1 Scope Definition

The initial stage of the case study identified the activities performed across the CSU and then related these activities to the functional areas outlined in the TMM. To demonstrate, the model necessitated identifying design engineering departments within the CSU. The vast size of the CSU provided many challenges for defining the scope of the case study. For example, operations reside in Generation, Transmission and Distribution, and Customer Service and Marketing business units. Also, human resources is administrated centrally, yet it has allocated resources and responsibilities to individual business units. Still other QMS functional areas such as customer service and top management are relegated to more isolated sections of the CSU.

A list of CSU departments to include in this case study (Table 4-1) was developed by consulting organisational charts and with input from representatives of the CSU itself. For example, the CSU departments responsible for the customer satisfaction survey, customer service operations, customer contact centre, and business communications were related to the marketing and customer service functional area. For some functional areas of the TMM, only one department from the CSU was chosen as a representative. In the case of design engineering, the Generation business unit's electrical engineering design department was chosen. The meter services department of the Customer Service and Marketing business unit was selected as an example of operations within the CSU.

Table 4-1: ISO 9001:2000 TMM Functional Areas and Related CSU Departments

ISO 9001:2000 TMM Functional Areas	Case Study Utility Departments
Top Management	- Corporate Strategic Business Plan - Corporate Planning and Development
Marketing & Customer Service	- Customer Satisfaction Survey - Customer Service Operations - Customer Contact Centre - Business Communications
Design Engineering	- Electrical Engineering Design (Generation)
Operations	- Meter Shop (Customer Service & Marketing)
Procurement	- Corporate Purchasing Department
Human Resources	- Human Resources - Engineers-in-Training (E.I.T.) program - Employee Survey
Accounting & Finance	- Corporate Finance and Administration
General Services	- Information Technology Services - Corporate Facilities
QMS Administration	- Public Affairs - Internal Audit - Quality Improvement Initiative

4.3.2 Data Gathering

The next step in the case study involved gathering information about each of the identified department's quality activities. To help with this, a list of questions based on the responsibilities and requirements laid out in the TMM and ISO 9001:2000 was drafted for each department. Documentation on the CSU's intranet and interviews with departmental managers was used to supply answers to these questions. Care was taken in drafting interview questions to ensure a descriptive answer was required. This helped in gaining optimal information regarding QMS activities and processes. The interview process also complied with the University of Alberta's research ethics guidelines. Appendix B details the ethics application and consent form that all participants were required to sign before taking part in the study.

4.3.3 Data Compilation

Compiling all the collected data provided a good baseline for the broad range of activities that occur throughout the CSU. This information will also hopefully be beneficial to the CSU beyond the boundaries of this research project and would be a useful input to future research and improvement initiatives.

Information gathered for each department was summarised into tables, which can be found in Appendix A. Table 4-2 provides an example of the case study information relating to the CSU's customer satisfaction survey. The collected data was used to draw flowcharts for each CSU department in the study. The flowcharts proved beneficial for illustrating the flow of activities and their associated inputs and outputs, sources and storage of information, and the relationship between different areas of the CSU. The flowchart drawn for the customer satisfaction survey is shown in Figure 4-3, while all the case study's flowcharts can be found in Appendix A.

Table 4-2: Customer Satisfaction Survey Results

How was the Customer Satisfaction Survey developed, reviewed and revised?
- Survey was initiated in 1999 by Customer Service & Sales department. - Performed quarterly - Looked at what was done before for guidance (e.g. CEA Survey) - Sections of survey: a. Customer Satisfaction b. Corporate Citizenship c. Corporate Image d. Special Topic –request to survey customers about a special project, program (i.e. automated answer service for outages) - Questions reviewed quarterly for their applicability – look at historical information. - Survey not approved by Executive – belongs to Customer Service & Marketing.
Who is responsible for administering the survey and reporting results? **What is the average response rate? Are there initiatives for improvement?**
Administration: - 10 point scale, random sampling - Conducted over telephone by external company - Require 500 completed questionnaires. Track refusal rate and response rate (including # busy signals, no answers, language barriers, etc.) - No work is currently being done at improving response rate Results Compilation: - External company prepares initial results - Customer Marketing & Sales division prepares quarterly report on findings - Report has been revised and is now shorter and more readable - Control limits included with results to show historical (acceptable scores) to reduce panic, etc. if results change - Report indicates if measures increase or decrease dramatically – helps to show where action should be taken Results Communication: - Report available upon request (distribution list) – currently not distributed corporate wide or available on line - Some conclusions provided, surmising about why results changed, etc.
What are the survey results used for – are they valuable for planning purposes? **Are comparisons done between quarters to identify improvements/problems?** **Is the information compared with other organisation results?**
- Results used strategically and operationally. - Strategically – feeds into Goals & Measures – quarterly executive management review. - Operationally, used as a tool to assist in improvement. - Managers not held accountable to act on problem areas in survey – survey administrators believe links between survey and actions taken are weak. - Results compared with CEA survey, which uses similar questions/format. - Results compared with previous surveys.

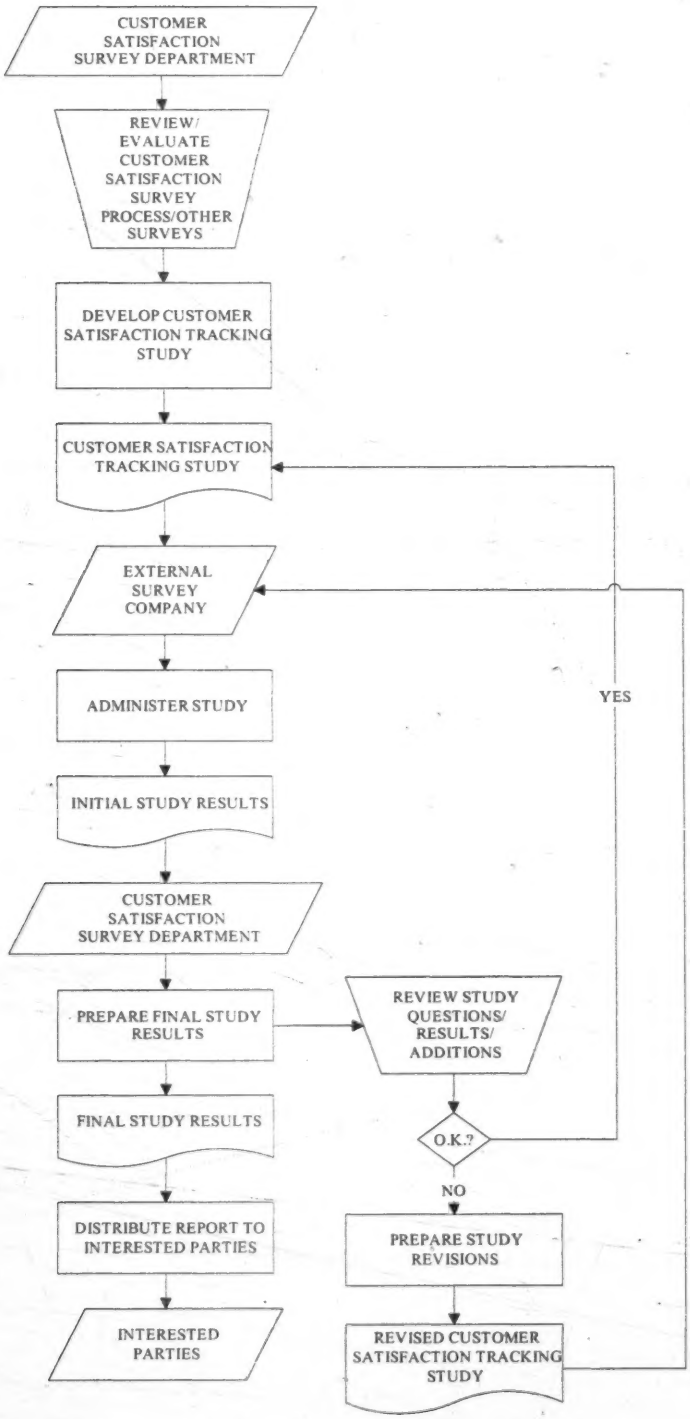

Figure 4-3: Customer Satisfaction Survey Process

4.4 QMS Case Study Results

As shown in Table 4-1, the functional areas prescribed by the TMM are comprised of various CSU departments. However, analysing the CSU from the opposite direction shows that various functional areas constitute each of the CSU's business units. Figure 4-4 shows how the QMS is distributed throughout the CSU. As can be seen, the functional areas of top management, QMS administration, general services, human resources, and accounting and finance are administrated centrally by the CSU, yet they have resources assigned business units across the organisation. The functional areas of design engineering, operations, and marketing and customer service however are managed independently by each business unit.

Results of the current state of quality activities for each functional area were also developed. Table 4-3 provides a summary of these results, while a more detailed listing of results for each functional area can be found in Appendix D. The tables in Appendix D list both the findings of the case study and the requirements of the TMM. Therefore, comparisons between the CSU's current QMS and ISO 9001:2000 requirements can be made easily, leading to suggestions to assist in achieving compliance.

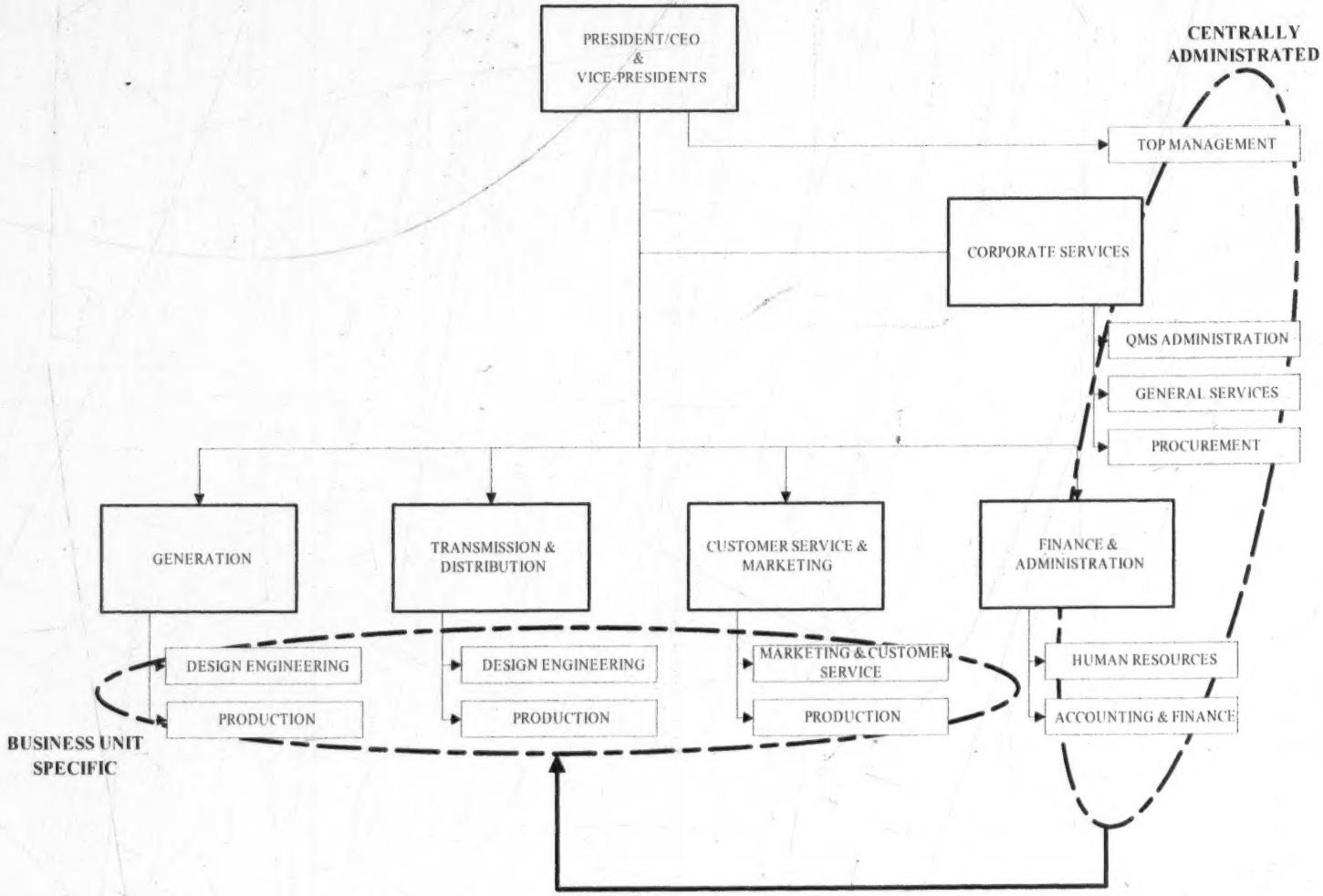

Figure 4-4: Distribution of CSU QMS

Table 4-3: QMS Case Study Results Summary

ISO 9001:2000 TMM Functional Area	CSU Activities
Top Management	- Corporate Strategic Plan (CSP) detailing CSU's vision, mission, operating principles, goals, and measures. CSP emphasises provision of quality service/customer satisfaction. - CSP drafted annually and reviewed quarterly. - No official QMS or QMS administration responsibilities exist. - Internal Audit assesses management systems and reports administratively to top management. - Addition of CSU resources requires top management approval.
Marketing & Customer Service	- Quarterly Customer Satisfaction survey performed. - Customer feedback welcomed and assists in determining and maintaining marketing programs. - Main interface with customers, providing account services, meter reading, inquiries, complaints. - Numerous quality improvement initiatives, primarily based on business plan goals and measures. - All promotions and marketing done through this department.
Design Engineering	- Projects initiated by asset owner and tied closely with budgetary constraints. - Stages of design: business enterprise planning, project planning, implementation, closure. - Each stage of design requires review and approval by involved parties. - All documentation is controlled and "lessons learned" database maintained for improvement. - Sponsor E.I.T. program, assists in the development of design engineers.
Operations	- Meter Shop compliant with Measurement Canada guidelines, which are similar to ISO 9000. - Jobs are classified and employees follow structured training program. - All processes, material, measurements, equipment monitored and tracked. - Corrective Action Requests and improvement initiatives evident in department. - Monthly internal audits and annual external audits performed to maintain compliance.
Procurement	- Purchased material classified based on criticality (three classes: A, B, C). - Strong communication with design engineering for critical parts. Communication weaker regarding middle criticality parts. - Alliances formed with vendors. - Incoming inspection assesses quality of purchased material. - Vendors are encouraged to demonstrate quality improvements to CSU.

Table 4-3 QMS Case Study Results Summary (Continued)

ISO 9001:2000 TMM Functional Area	CSU Activities
Human Resources	- Classification, review, and maintenance of job descriptions. - Administration of staffing requirements and qualifications. - Administration of internal and external hiring. - Training programs for engineering and commerce graduates and field workers. - Encourage employee development through personal plans and training programs.
Accounting & Finance	- Maintain budgets which are used as an input to planning processes and resource requirements. - Provide guidelines for corporate accounting and finance activities.
General Services	- Administrates and provides resources for corporate facilities. - Administrates and provides resources for information technology.
QMS Administration	- No formal quality program, manual, or documentation. - Public Affairs is the main conduit for top management to promote quality in the CSU. The main vehicle is the CSP. - Performance improvement advisors were trained to guide and promote quality improvement – unfortunately management support is not uniform throughout the CSU. - No formal quality program audit performed since the program is not formalised. Internal audits assess management processes throughout the CSU

4.5 QMS Case Study Gap Analysis

As suspected, the CSU already has many components of a QMS in place. Results from this QMS show excellent performance in regards to some key performance indicators. For example, the CSU offers among the lowest retail rates in North America, which can be attributed to efficient operations. The utility ranks first in CEA's national customer satisfaction survey of Canadian electrical utilities and it also provides an average customer outage duration time that is eighty-one minutes less than the target it set for itself. However, there were some gaps identified between the responsibilities laid out in the TMM and the current CSU quality activities and addressing these gaps should assist the CSU in improving their already exceptional performance. For example, the QMS will need to be formalised and a quality policy and manual will need to be drafted in order to satisfy the documentation requirements of ISO 9001:2000. Better communication between design engineering and purchasing regarding material of average criticality to design and giving more attention to feedback from customer and employee satisfaction surveys are also areas of focus where major benefits could be realised. Table 4-4 provides a summary of the gaps noted between the responsibilities for each functional area of TMM and the current quality activities of the CSU. Further descriptions of these gaps follow in subsequent sections of this chapter.

Table 4-4: QMS Case Study Gap Analysis

ISO 9001:2000 TMM Functional Area	ISO 9001:2000 Responsibilities	Gap Analysis
Top Management	- Establishment/ maintenance of quality objectives - Formulation/maintenance of quality policy - Initiation/supervision of quality program - Appointment of management representative and appropriate area leaders - Auditing for compliance - Provision of resources for implementation - Assessment and improvement of organisation	- Establishment of quality policy and objectives - Appointment of QMS management representative - Provision of QMS resources - Demonstrate QMS support to CSU - Establish QMS audits
Marketing & Customer Service	- Establishment of processes & documentation - Administration of customer satisfaction survey and market research - Determination of product specifications - Advertising, promotion of products/services - Personnel training - Customer service - Assessment and improvement of processes	- More formal attention given to feedback obtained from Customer Satisfaction Survey and Complaints
Design Engineering	- Establishment of processes & documentation - Research of quality aspects/requirements - Technical detail development and planning - Review, verification, and validation of design - Control of design modifications/updates - Personnel training - Determination of quality specifications and resource requirements - Assessment and improvement of processes	- Improved communication with purchasing - More formal consideration given to quality aspects when planning and designing

Table 4-4: QMS Case Study Gap Analysis (Continued)

ISO 9001:2000 TMM Functional Area	ISO 9001:2000 Responsibilities	Gap Analysis
Operations	- Establishment of processes & documentation, including production plans, inspection plans, test plans, identification and traceability. - Clarification/validation of quality aspects of design - Determination of technical/human resources - Personnel training - Product and customer property preservation - Assessment/establishment of process capability - Control of monitoring and measuring devices - Control of nonconforming product - Assessment and improvement of processes	- Good example of an effective QMS
Procurement	- Establishment of processes & documentation - Development of specifications to measure purchased product quality - Clarification of requisitions - Selection/negotiation with qualified suppliers - Training of personnel - Verification of quality of deliverables - Assessment/recording of supplier performance - Product preservation - Assessment and improvement of processes	- Improved communication with design engineering

Table 4-4: QMS Case Study Gap Analysis (Continued)

ISO 9001:2000 TMM Functional Area	ISO 9001:2000 Responsibilities	Gap Analysis
Human Resources	- Establishment of processes & documentation - Determination of staff requirements and qualifications - Preparation of job descriptions - Provision of conditions conducive to good workmanship - Training, education, and motivation of personnel to achieve organisation's quality objectives - Assessment and improvement of processes	- More formal attention given to feedback obtained through the Employee Survey
Accounting & Finance	- Establishment of processes & documentation - Provide guidance and control for available resources, budgets - Training of personnel - Assessment and improvement of processes	- More representation throughout CSU for quantifying economics benefits from improvement initiatives
General Services	- Establishment of processes & documentation - Secure safety of facilities and workplaces - Assessment and control of environmental conditions - Training of personnel - Assessment and improvement of processes	- Adheres to responsibilities
QMS Administration	- Establishment of processes & documentation - Preparation & maintenance of quality manual - Organisation & guidance of quality program - Initiation & coordination of quality improvement programs - Review & audit of quality program - Assessment & improvement of processes	- The administration and assessment of the quality program - Establishment of a quality manual - Increased awareness of benefits of quality - Corporate-wide documentation control system

4.5.1 Top Management Function Results

A major gap identified is the lack of formality of the CSU's QMS. Many quality activities occur throughout the CSU, but they are not administrated under one management structure. Therefore, top management needs to first establish a corporate-wide quality policy and associated quality objectives. The CSU has established a vision, mission, and ten corporate objectives, with references to the provision of quality service. As in the case of the EMS, the CSU will also need to explicitly state a policy and objectives related to QM. Figure 4-5 illustrates how the policies and objectives of the CSU's QMS and EMS could be derived from the organisation's vision, mission, and objectives. Essentially, the QMS and EMS policies and objectives would be sub-sections, and would relate to a component of the CSU's vision, mission, and objectives.

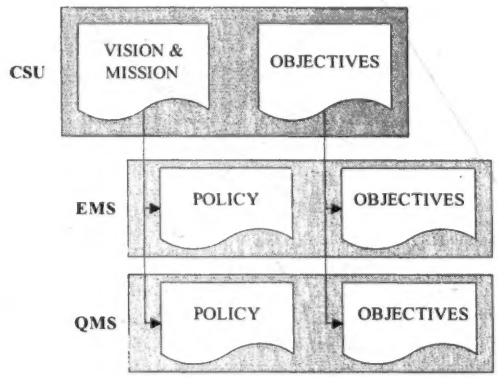

Figure 4-5: Development of QMS Policy & Objectives

Furthermore, a representative from management must be appointed to assume responsibility of the QMS and top management must be willing to dedicate resources for the implementation and maintenance of the system.

Besides establishing a policy and deploying resources, top management must be seen as promoting and encouraging the QMS. The Corporate Strategic Plan (CSP), an annual document developed by top management, reports the organisational vision, mission, principles, and goals. The CSP or a similar medium such as an intranet website or monthly circular could be used to also spread the quality message throughout the CSU.

Currently there is no formal QMS structure to assess. However, with the development of a QMS structure, there will be a need to develop an assessment method. The CSU has a strong internal audit department that would be a suitable asset to the assessment process.

4.5.2 Marketing & Customer Service Function Results

Being a service organisation, the CSU has a very strong marketing and customer service infrastructure. A great deal of information is gathered from customers, particularly through the customer satisfaction survey, customer focus groups, and the ongoing receipt of complaints. However, it is not always apparent that management gives formal attention to this customer feedback. For example, departments are required to resolve customer complaints expeditiously. Still, there is no recognized requirement to use this valuable feedback to identify and eliminate the root cause of problems. Also, links between customer satisfaction survey results and formal follow-up actions is weak. Issues arising from customer feedback are likely addressed, but there is no formal recording or tracking. Adding formality to addressing customer feedback would lead to more groups working together to ensure identified problems identified are addressed.

4.5.3 Design Engineering Function Results

The design engineering department investigated has established strong quality management processes. In particular, the stages of design engineering have been well established and involved parties generally seem to know their responsibilities. Being an electrical utility, reliability of design is imperative to ensure customers receive a steady supply of electricity. The CSU's design engineering departments must ensure that quality aspects of designed are promoted. Tools to assist with this are Failure Mode, Effect, and Criticality Analysis (FMECA) and Fault Tree Analysis (FTA) which are methods to identify possible ways in which a design can fail (Juran 1988).

4.5.4 Operations Function Results

The department chosen to represent operations in the CSU is an appropriate example of an effective QMS. The Meter Shop is compliant with Measurement Canada guidelines and these guidelines are closely aligned with ISO 9001:2000. The Meter Shop manages operational employees, identifies and traces material going through its processes, controls monitoring and measuring devices, and measures and attempts to improve the output of each process. Therefore, the case study investigation shows that the operations of this CSU department were compliant with the TMM. The QMS would be a good example for other CSU operations such as generation stations when electricity is initially produced.

4.5.5 Procurement Function Results

The quality processes in this department were well established. Especially positive to see was the emphasis given to forming alliances with suppliers and encouraging them to improve their quality. In essence, this department is addressing the root cause of

potential problems; poor quality raw material. An improvement suggestion would be enhanced communication with design engineering. As uncovered through interviews, there are few problems with purchased highly critical parts not conforming to the required specifications. However, control is sometimes lost when acquiring parts that are not as critical to the overall engineering design. Perhaps the specifications developed by design engineering are not clear enough or perhaps the purchasing department does not always follow specifications or ask for clarification before purchasing. Whatever the root cause of the problem, clearer processes should be investigated to reduce the volume of purchased material that either cannot be used or needs to be reworked, which results in extra material and labour costs.

4.5.6 Human Resources Function Results

The human resources processes uncovered were also very encouraging in regards to the CSU complying with ISO 9001:2000. Especially positive was the training program developed for new engineering graduates, which offers exposure to different areas of the CSU, provides mentoring, and assists in attaining professional designation. One suggestion for this department would be to more formally address Employee Survey feedback. This survey, which is actually administrated by Corporate Planning and Development and not Human Resources, should and actually does provide valuable information about how employees perceive the CSU and their working environment. Managers are encouraged to develop actions plans to address identified problems, yet it is not always visible how this feedback has assisted in business planning and improvement initiatives. More leadership and involvement in regards to acting on Employee Survey feedback would assist the CSU in realising the full benefits of this survey.

4.5.7 Accounting and Finance Function Results

The accounting and finance functional area provides very strong support for budgetary and financial services. Aside from these functions however, this area should play an important role in improvement activities throughout the CSU since the underlying objective of any improvement initiative should be its economic benefits and costs. Providing economic analysis expertise for project justification would be extremely beneficial in winning over managers that are sceptical of quality.

4.5.8 General Services Function Results

The General Services department of the CSU, which provides and maintain physical and technological infrastructure, provides a comfortable and suitable atmosphere. Employees are equipped with the material and resources needed to perform their jobs and the working environment is healthy and safe.

4.5.9 QMS Administration Function Results

Based on the informality of the QMS, its administration has some substantial gaps. The first major gap with the ISO 9001:2000 TMM is the absence of a quality manual. A formal structure, and accordingly a manual, has been established for the CSU's EMS and provides a good reference for developing a quality manual. There is also the opportunity here for integrating either the entire quality and environmental management system manuals or components of each. For example, a central documentation repository could support both the QMS and EMS of the CSU and employees could access information on both MS's through the same intranet page. Following some formal structure therefore, the QMS will need to be administrated and assessed regularly, probably by using

dedicated management resources and the existing internal audit department respectively. Other initiatives should include the spread of quality awareness throughout the organisation. Previous training of employees in quality improvement techniques is a good start, but of course awareness should be an ongoing practice.

Another possible suggestion would be the implementation of a corporate-wide document control system to act as the only repository for all documents related to the CSU. Currently, document control is the primary responsibility of each area. Benefits could be realised from the reduction in documentation duplication, stronger revision control, and easier sharing of information. Care would have to be taken in controlling what actually goes into the system and documents would have to be intuitively named or easily searched since the volume of information has the potential to be quite overwhelming.

4.6 Summary

Within this chapter, the CSU's QMS was described and compared with the TMM. Results from this comparison were used to identify gaps and develop suggestions for improvements to the CSU's QMS.

So far, the original work of this thesis has mainly addressed how an electrical utility can operate in order to provide quality service. As mentioned in the literature survey however, mistakes are a part of doing business and dissatisfied customers can never be eliminated or ignored. Therefore, the next two chapters of the thesis will address customer dissatisfaction and look at ways to resolve complaints and use this valuable feedback to enhance an organisation's QMS.

5 Complaints Handling and ISO 10001/2/3

5.1 Introduction

Organisations universally aim to satisfy their customers. Quality management enables organisations to minimise dissatisfaction, yet reality dictates that errors will never be entirely eliminated. Therefore, it is a business necessity for organisations to handle complaints from unsatisfied customers. The following chapter looks further into the management of complaints, specifically discussing:

- the objectives of CH and the ISO 10000 family of standards,
- a CH model based on ISO 10002:2004, and
- opportunities for integrating CH and QM.

5.2 Objectives of Complaints Handling

QM and CH are an interesting pairing in the quest for CS. QM, in particular ISO 9000, strives to reduce variation to inherently provide customers with satisfactory products and services. CH however exists to manage the dissatisfaction that stems from variation. A further dimension of this comparison is the nature of satisfaction versus dissatisfaction. Customers are generally satisfied in the same way, which occurs when their expectations are met. However, there are countless ways an organisation can fail to meet customer expectations. An analogy can be drawn with the opening line of Leo Tolstoy's novel *Anna Karenina*, which states "Happy families are all alike; every unhappy family is unhappy in its own way." Therefore, it follows that like every unhappy family is unhappy in its own way, every unhappy customer is unhappy in his or her own way.

With the recognition that customer dissatisfaction is unique and unavoidable, organisations then need to capitalise on the benefits of CH.

In essence, complaints provide organisations with an opportunity to recover CS. As illustrated in Figure 5-1, a comparison can be made with a manufacturing rework process. Since nature does not allow perfection, non-conforming product is a reality of manufacturing. However, effective manufacturing processes typically allow for rework to restore non-conforming product to intended specifications. CH can therefore be described as reworking customer dissatisfaction to restore satisfaction.

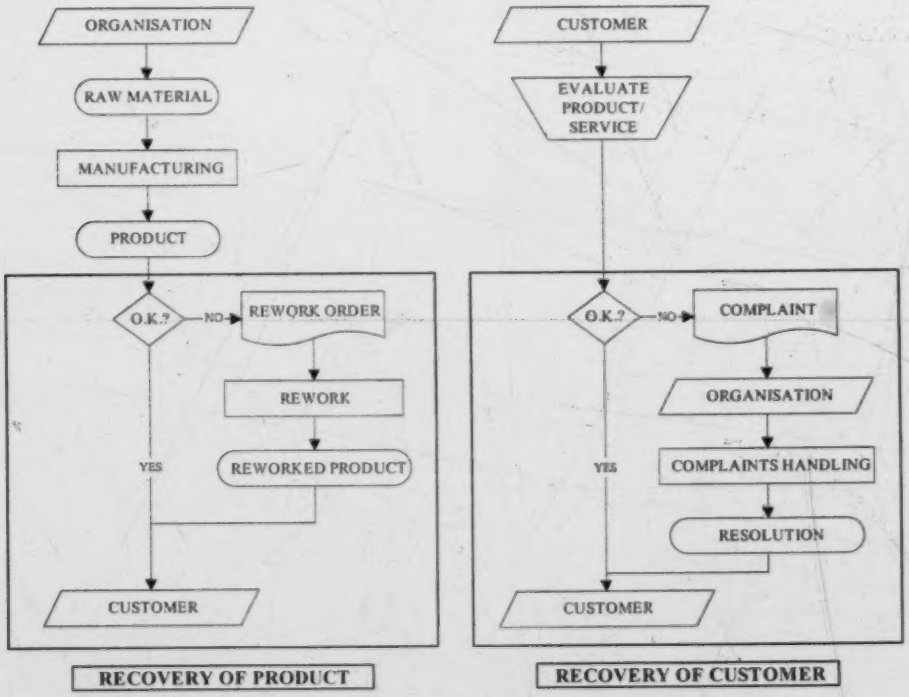

Figure 5-1: Manufacturing and Customer Satisfaction Rework

Another component of any QMS is continuous improvement, which assists organisations in maintaining or even exceeding historic levels of CS. Combining feedback from all

complaints is a valuable input to continuous improvement. By lodging a complaint, a customer is telling an organisation that he or she is dissatisfied and is also providing specifics contributing to this dissatisfaction. Effective organisations use this feedback constructively to investigate the dissatisfaction root cause. Acting to eliminate these problems translates into process improvements and ultimately the minimisation or even prevention of future complaints, and in turn dissatisfaction.

In summary, Figure 5-2 illustrates how the establishment of a CH system meets two organisational objectives. First, it restores CS through complaint resolution. Secondly, the feedback obtained from complaints assists an organisation to continuously improve.

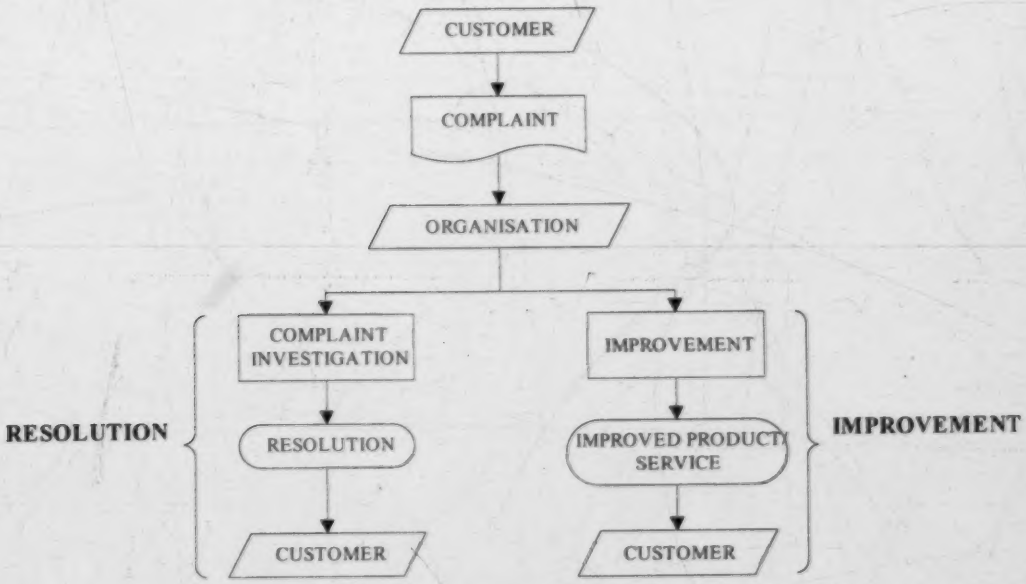

Figure 5-2: Complaints Handling Objectives

5.3 ISO 10000 Family of Standards

From the development of the ISO 10000 family of standards, it is evident the international business community recognises the importance of CH. As outlined in Chapter Two, this series of three standards provides guidelines for the development of codes of conduct and for the resolution of complaints by organisations or through external parties. Beyond the provision of CH guidelines however, the ISO 10000 series also provides a conceptual vision of how complaints are managed. The order and naming of this set of standards is representative of complaint severity and the number of parties involved in the handling of the complaint. Also, comparisons can be made between the ISO 19011 guidelines for QMS and EMS auditing and the ISO 10003 guidelines for external complaint resolution. For example, both quality auditing and external dispute resolution processes employ external parties. In the case of a quality audit, an independent and impartial audit team assesses how well an organisation complies to a set of standards, namely ISO 9001:2000. External dispute service providers are also from outside the organisation and are mandated to either assist in or provide a complaint resolution that is fair to both the dissatisfied customer and the organisation involved.

5.3.1 Complaint Progression

The first standard in the ISO 10000 series, ISO 10001, outlines the characteristics of a good customer satisfaction code of conduct. By establishing such codes of conduct, organisations are attempting to shape customer expectations in an effort to prevent complaints (Dee et al., 2004). Figure 5-3 illustrates this with an example from an electrical utility. The suggested code of conduct specifies a time period for service connection. If service is not connected within this period, customers receive a discount.

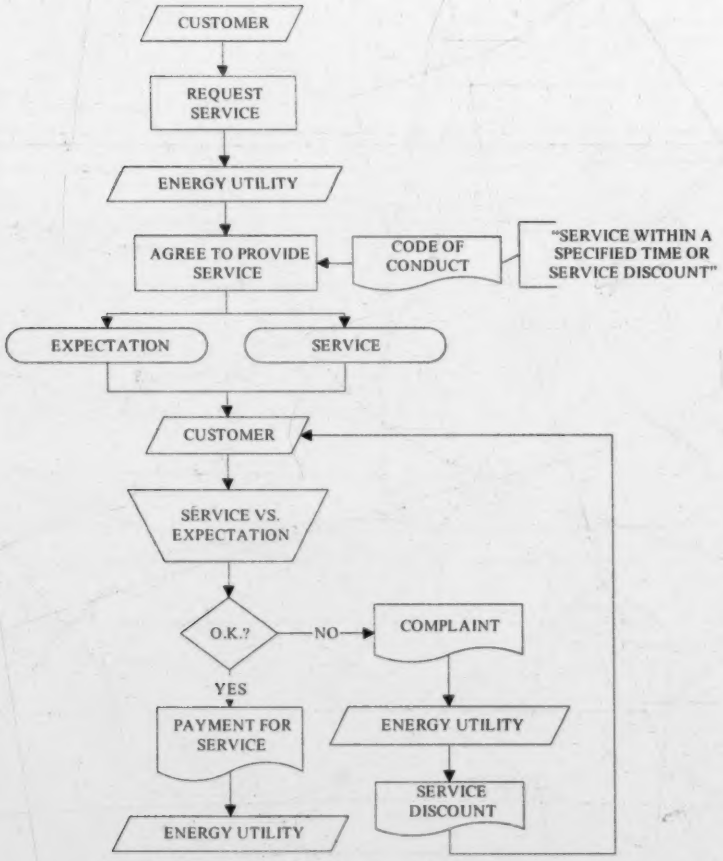

Figure 5-3: Example of an Electrical Utility Code of Conduct

In regards to the CSU, no definite customer satisfaction code of conduct relating to the length of time for service connection exists since power outages and emergency situations take precedence over service connection. However, if service previously existed at the location, reconnection is generally scheduled for the same day. In the case where the service connection has not been physically disconnected, account information at that location can be altered during the service request and the customer immediately assumes ownership of the service account.

Aside from merely establishing codes of conduct however, organisations also must consider both the quality of design and the quality of conformance (Juran 1993). This can be demonstrated by referring to the example in Figure 5-3. If the electrical utility fails to provide service within the specified time frame, customers are entitled to a service discount. Failure to provide customers with this discount affects the quality of conformance, since the electrical utility fails to comply with its own established code of conduct. On the other hand, the electrical utility may have excellent quality of conformance but the design of the code of conduct itself may be of poor quality. For example, if a customer requests electricity service and is told that it will take two months for delivery, it is likely this customer will not be satisfied.

However, even with the establishment of appropriate codes of conduct and attempting to adhere to customer expectations, organisations are not always able to satisfy all customers. In this instance, the first course of action typically taken by a customer is to formally lodge a complaint with the organisation, in turn requesting a resolution. Conveniently, the second standard in the ISO 10000 series, ISO 10002, provides guidelines for organisations to handle complaints. Whereas the output from ISO 10001 was a product, a code of conduct, ISO 10002 prescribes how to design and implement a process to effectively handle complaints. To explain this distinction further, I will provide the definitions of a product and process provided by ISO 9000:2000. A "process" is defined as a "set in interrelated or interacting activities which transforms inputs into outputs" (ISO 9000:2000). In the case of the process prescribed by ISO 10002:2004, the CH process takes a complaint (customer dissatisfaction) and turns into a

complaint resolution (customer satisfaction). A "product" is defined by ISO 9000:2000 as the "result of a process". In the case of a code of conduct, the process of developing the code results in the code itself.

Failure of organisations to resolve complaints provides customers with a further option to escalate their complaint to achieve satisfaction. Fittingly, the third and final standard in the ISO 10000 series, ISO 10003, provides guidelines for external dispute resolution and gives direction to bother the organisation and the external dispute service provider (EDSP). For external dispute resolution, an EDSP acts as an unbiased party to either facilitate, advise, or determine a complaint resolution. Customers of electrical utilities often complain to their elected member of the legislative assembly (MLA), an EDSP, when new physical infrastructure is being developed. Electric utility customers may have concerns about the environmental impact or aesthetics of a new generation station or transmission system in their region. MLA's have the authority to approach the electrical utility and also to elevate these concerns to the level of the premier in order to arrive at a suitable resolution.

Figure 5-4 has been prepared to further illustrate the progression of complaints and the users of each of the ISO 10000 standards. This figure also shows how the ISO 10000 series can work in concert with ISO 9000. Connections between the two families of standards show how ISO 9000 is instrumental in providing the initial product or service and also how it is a catalyst for continuous improvement.

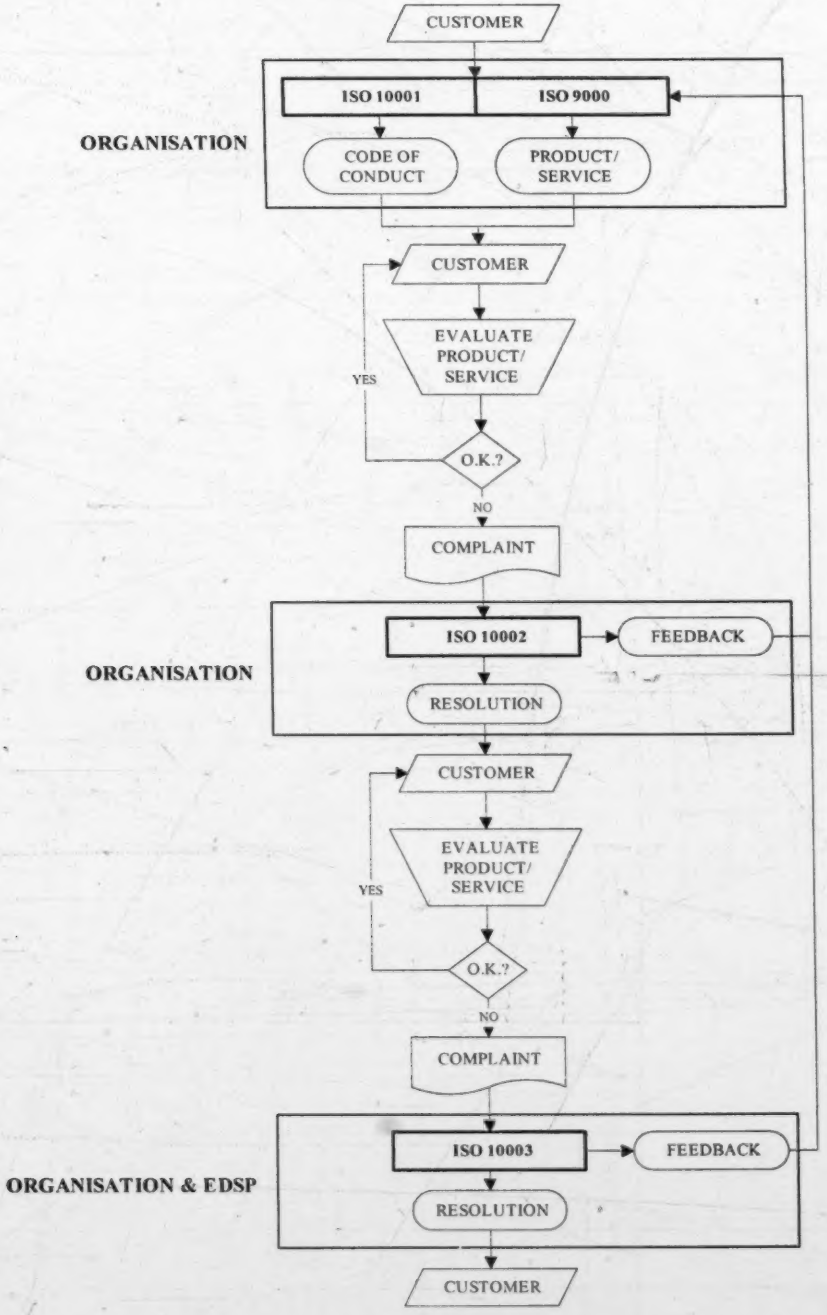

Figure 5-4: ISO 9000 and ISO 10000

5.3.2 Naming of ISO 10000 Standards

Besides being aptly ordered to represent the severity of complaints, from prevention to internal complaint resolution, to ultimately resolving complaints through external parties, the ISO 10000 series is also appropriately numbered to represent the number of parties involved in the various stages of CH. ISO 10001 involves one party – the organisation itself. In ISO 10002, the standard provides guidelines for only the organisation, but the CH process is initiated by the customer, so essentially two parties are involved. In ISO 10003, once again the CH process is initiated by the customer but the standard provides guidelines for both the organisation and the EDSP. Therefore, three parties are involved. Figure 5-5 further illustrates the relationship between the naming of the ISO 10000 series of standards. The intersection of circles represents the number of parties implicated in each standard.

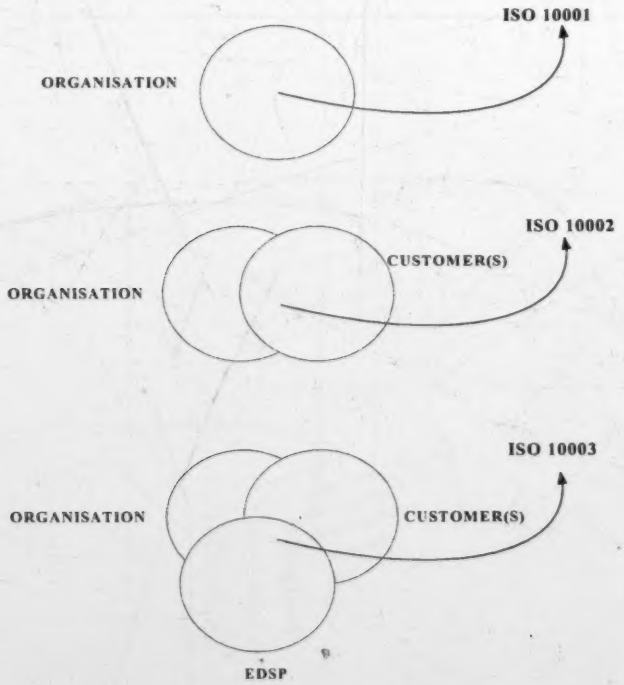

Figure 5-5: ISO 10000 Naming and Party Involvement

5.3.3 Auditing and Independence of Complaint Resolution

An interesting comparison can be made between ISO 10003 and the guidelines for quality and environmental management system auditing, ISO 19011. As mentioned, ISO 10003 provides guidelines for organisations and EDSP's. Interestingly, ISO 19011 also provides guidelines for two parties, the auditor and the organisation being audited. The objectives of the guidelines themselves are different of course, with ISO 19011 providing guidelines to assess compliance whereas ISO 10003 provides guidelines for resolving complaints caused by variance and in turn non-compliance. However, their objective of guiding both organisations and external, independent parties coincides nicely and this is illustrated in Figure 5.6.

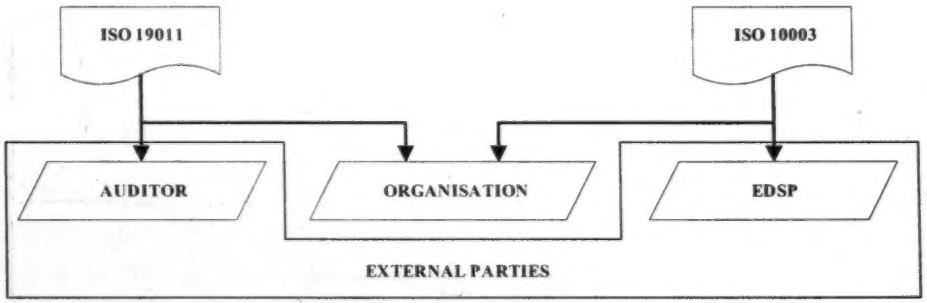

Figure 5.6: ISO 19011 and ISO 10003

A comparison between ISO 10003 and ISO 19011 can also be made based on the number of parties involved. Figure 5.5 shows the number of parties involved in the ISO 10000 series of standards. Taking this comparison one step further, a comparison can be made with ISO 9000, 9001, and 19011, with this comparison shown in Figure 5.7. ISO 9000 provides terms and vocabulary for QM. ISO 9001, like ISO 10002, provides guidelines

for organisations to develop a process to satisfactorily deliver products and services to customers. ISO 19011 audits this process, employing a third party auditor.

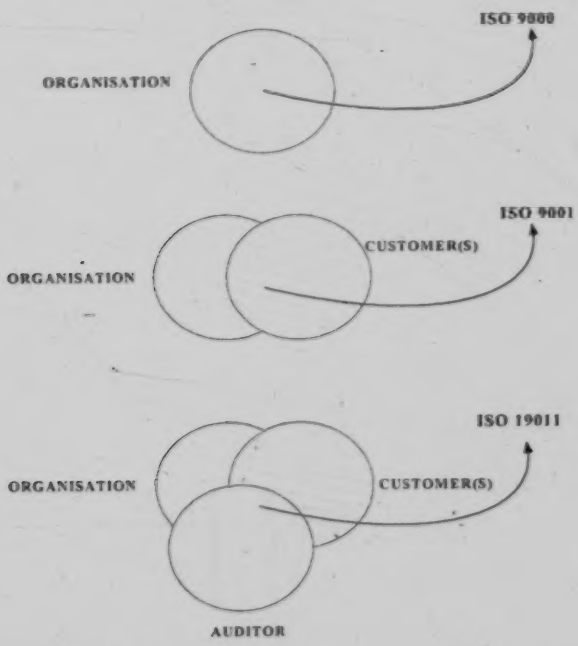

Figure 5.7: ISO 9000, 9001, and 19011 and Party Involvement

5.4 ISO 10002:2004 Model

With the introduction of any new standard, it is expected that interpretations and models for implementation will follow. This is evident in regards to ISO 9000, where a consulting industry unto itself exists to guide organisations in obtaining and maintaining registration. Consequently, the introduction of the ISO 10000 series of standards also provides new research opportunities. In fact, the ISO 10002:2004 standard was published in July 2004, during the time in which I was writing this thesis. Coinciding with this standard therefore will be models, like the one presented in this research, to help organisations comply with the new internationally accepted guidelines for CH.

As illustrated in Figure 5-2, the main objectives of CH are complaint resolution and improvement. Complaint resolution is essentially achieved through the CH process itself. Improvement however is realised mostly though supporting processes and proper management of information received through the CH process.

Guided by these two objectives and their relationship, a CH model has been developed and is shown in Figure 5-8. Based on five sections of ISO 10002, the model consists of a CH process core surrounded by a circle of supporting principles and processes. The seventh section of ISO 10002:2004, comprised of nine mostly serial activities, was used to show the steps of the CH process illustrated in the model's core. The surrounding circle is comprised of sections four, five, six, and eight, detailing the guiding principles, framework, planning and design, and maintenance and improvement respectively. It is fitting for these sections of the standard to form a circle since they are ongoing and facilitate improvement of the CHS and the organisation itself.

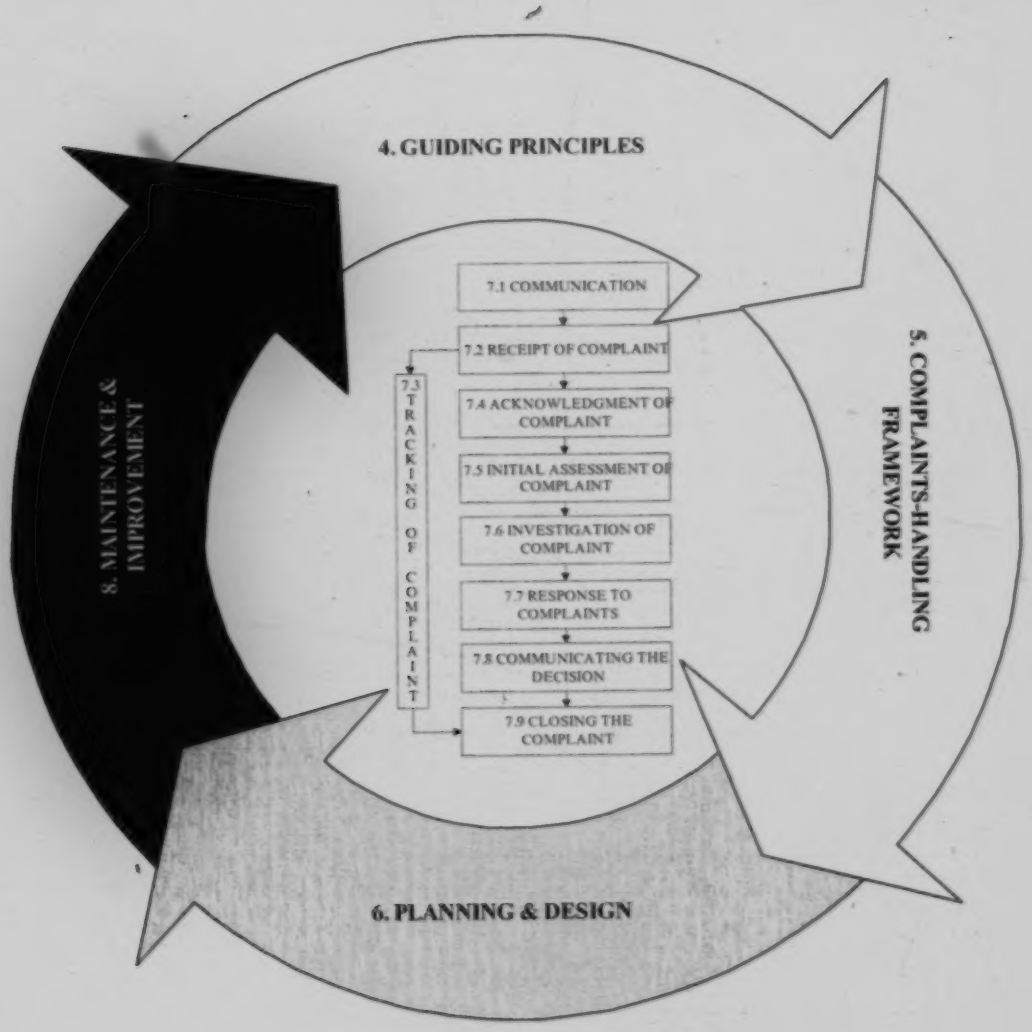

Figure 5-8: ISO 10002:2004 Model

In section four, nine guiding principles have been defined to help in providing assurance that the organisation has an effective CHS in place. To demonstrate how the guiding principles assist in CH, two principles will be explained: visibility and charges. In order to lodge a complaint, customers need to know how to contact an organisation. Therefore, it is imperative that organisational contact points are visible and accompany promotional and sales literature and broadcasts. Once customers contact an organisation, charging

them for lodging a complaint is poor business practice. Failure to establish these two guiding principles within a CH system will only increase a customer's dissatisfaction. Firstly, the customer has to spend time finding out how to contact the organisation. Once the organisation is finally contacted, the customer is asked to pay once again for seeking resolution to something that exists through no fault of their own. The combination of these two experiences therefore leads to an even unhappier customer.

Section Five of the ISO 10002:2004 standard provides a CHS framework. This framework details an organisation's commitment to CH, its CH policy, responsibilities, and authorities. Without this framework, the organisation will not know its CH goal and employees will not know what is expected or what can be gained in regards to CH.

With the CH framework place, the standard's sixth section lays out guidelines for planning and design. It is interesting to note that in Section 6.1, the standard states that "[t]he organisation should plan and design an effective and efficient complaints-handling process in order to increase customer loyalty and satisfaction, and also to improve the quality of the products provided." Essentially, this statement addresses the two identified objectives of CH: complaint resolution and improvement. In order to achieve these two main objectives the standard suggests that functional objectives be established, corresponding activities be carried out, and necessary resources be provided.

The final section of the standard, Section Eight, is the most explicit in terms of improvement. The collection of information, its analysis and evaluation, determination

of satisfaction levels, monitoring and auditing, management review and continual improvement are defined. It is apparent through these guidelines that it is not enough to resolve a complaint. Complaint feedback should be used to spur improvement.

5.5 QM and CH Integration

As mentioned previously, the ISO 10000 family of standards is related closely with ISO 9000 and ISO has mandated that these families of standards be aligned. Therefore, there are opportunities for integrating these management systems. For the ISO 9001:2000 and ISO 10002:2004 standards, similarities are obvious based on structure alone. Compatibility is also evident by the emphasis each standard gives to top management and how they both contribute to CS. When drafting the ISO 10002 standard, it is evident that SC 3 focused on compatibility with ISO 9001. The inputs, specified process, and outputs may be different but the approach is very similar, which is evident from Figure 5-9.

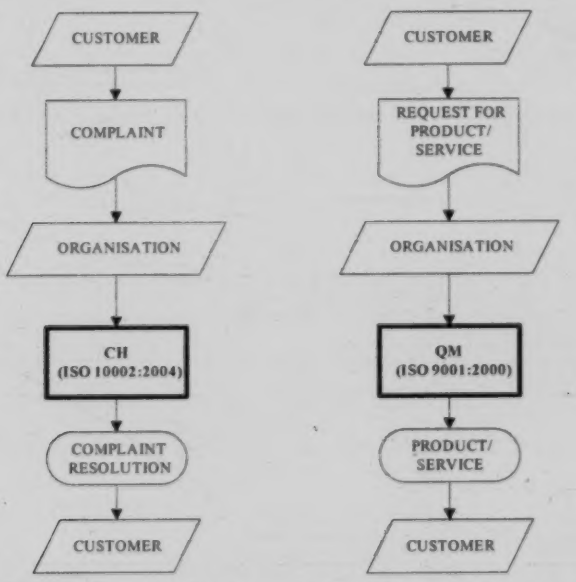

Figure 5-9: ISO 10002:2004 and ISO 9001:2001 Processes

The ordering of sections between the standards also corresponds. For example, section seven of ISO 9001:2000 details the requirements for providing the requested product or service while section seven of ISO 10002:2004 lays out guidelines for the actual resolution of a complaint. Section eight of each standard gives guidelines for measurement, analysis and improvement. Sections four, five and six are also similar, providing CH and QM guidelines for management commitment, establishment of policy and objectives, planning of and responsibilities for the system, and supply of resources. This sectional relationship is shown in Figure 5-10.

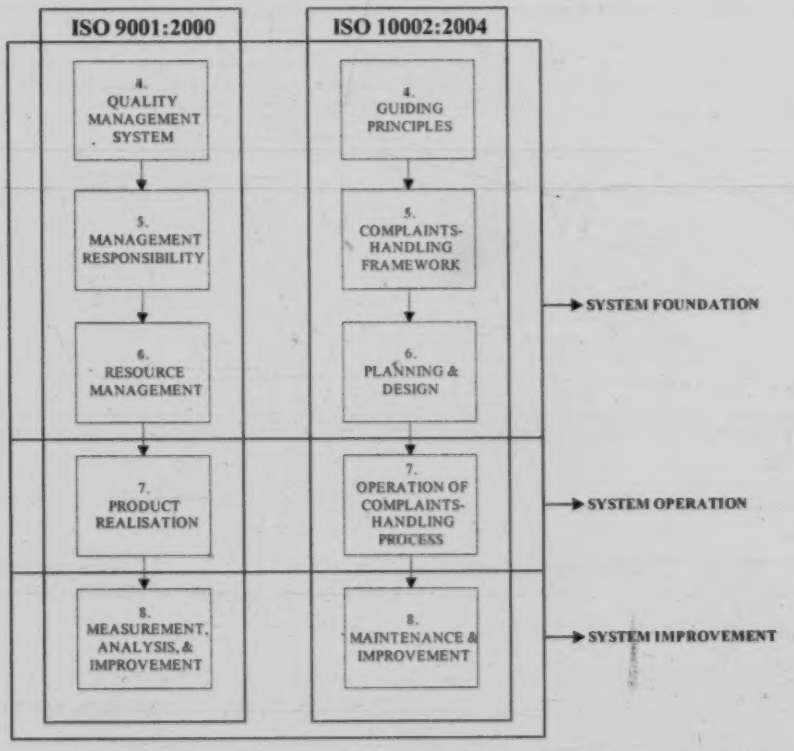

Figure 5-10: Sections of ISO 9001:2000 & ISO 10002:2004

5.5.1 Top Management in CHS

A large component of this research has involved the role top management plays in an organisation. In Chapter Three, ISO 9001:2000 was interpreted for top management and

it is evident from its text that the standard emphasises this level of management. Appropriately, the term top management also appears frequently throughout the ISO 10002:2004 standard. As with QM, top management is required to demonstrate and promote a strong commitment to CH and is responsible for establishing a CH policy and associated objectives. Beyond establishing the CHS, top management is also required to play a leading role in reviewing, maintaining, and improving, all the while ensuring management representation and necessary resources are deployed.

Like QM, the PDCA cycle can be applied to top management's involvement in the overall CH process. Top management plans the CHS and supplies resources. The organisation is then responsible for the do portion of the cycle, which requires resolving complaints. Top management then completes the cycle by checking the CHS performance and taking actions to maintain and improve. In Chapter Three, Figure 3-3 showed how the sections of ISO 9001:2000 relate to top management's role in the PDCA cycle and to a systems approach to ISO 9000 explained in Karapetrovic and Willborn (1998b). Interestingly, the structure of the ISO 10002:2004 standard lends itself to a similar comparison, which is shown in Figure 5-11. For example, section eight, maintenance and improvement, relates to the check and act portion of Shewhart's cycle and actual output and assessments steps of the systems approach.

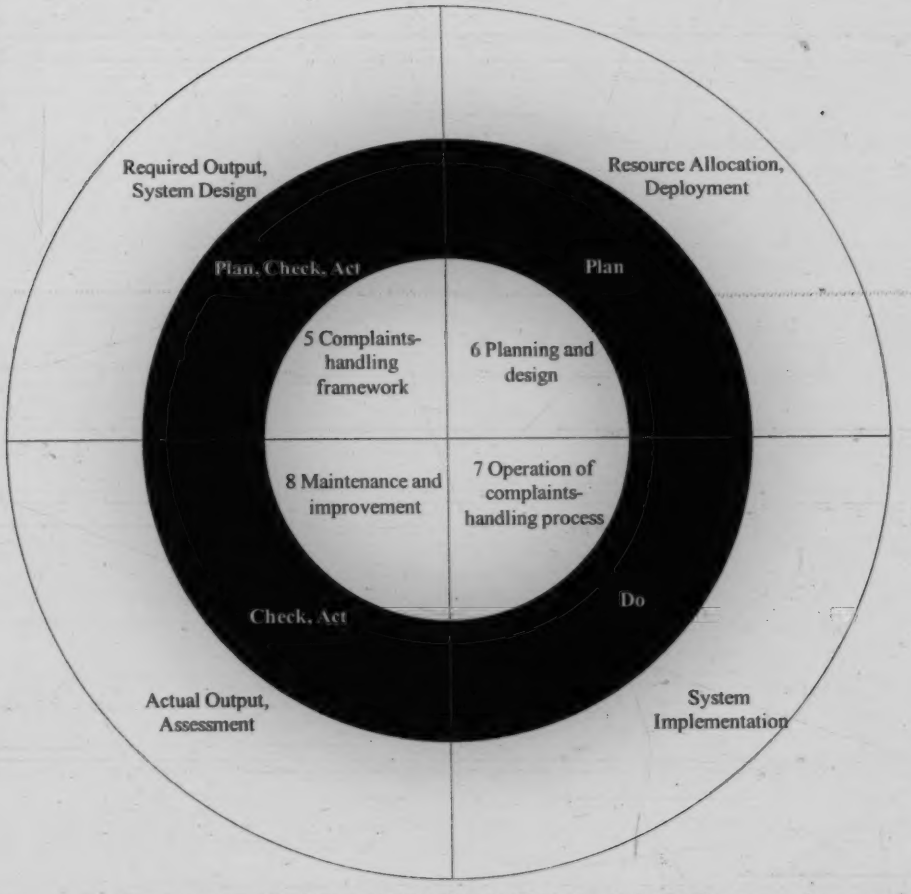

Figure 5-11: ISO 10002:2004, PDCA, and the Systems Approach

5.5.2 Integration for Customer Satisfaction

The ISO 9001:2000 standard makes only minimal reference to CH, specifying that customer feedback through complaints is a valuable part of review requirements related to products. However, ISO 10002:2004 makes the following references to QM:

- The standard title: *Quality management – Customer satisfaction – Guidelines for complaints handling in organisations*
- Section 0.2: "Relationship with ISO 9001:2000 and ISO 9004:2000"
- Section 6.3: "The complaints-handling process may be linked to and aligned with other processes of the quality management system of the organisation."

- Section 8.5: "The complaints-handling audit may be conducted as part of the quality management system audit, for example in accordance with ISO 19011."

Nine functional areas comprising a QMS were outlined in the TMM. The scope of four of these areas also fully meets the requirements of a CHS. CH normally falls under the responsibility of the Customer Service & Marketing function, so a large number of complaints would be resolved through its operations. However, as ISO 10002:2004 recommends, complaints can be received at all customer contact points, so CH should be a component of an organisation's QMS and its overall operations. Human resources assists in providing resources for both the QMS and the CHS and the activities of Accounting & Finance and General Services in a QMS would also fulfill the requirements of a CHS. Since procurement is mainly responsible for purchasing material for physical infrastructure such as generation stations or transmission grids, this QMS function is not applicable to a CHS. Computer equipment and other resources required to support the CHS are handled through the General Services function of the QMS.

For other QMS functional areas, some of their activities would also relate to CH activities. Top management in a QMS develops the quality policy and objectives. However, top management could use certain quality objectives and statements from the quality policy to establish a set of related CH objectives and a CH policy, with both showing commitment to CS. Top management can also demonstrate commitment and perform assessments of both systems simultaneously. In a QMS, design engineering is responsible for technical designs of infrastructure such as generation stations or

transmission grids. In a CHS however, design engineering mainly plans and designs the CH process and optimises the use of feedback for improvement. In the administration of both systems, there are also opportunities for CH to function as a sub-section of QM. For example, the CH manual could comprise a section of the quality manual. Feedback from complaints should be an input into quality improvement initiatives. A component of QMS audits should assess the CHS and certain quality performance indicators would measure the CH process.

Figure 5-12 illustrates this description of how CH can integrate into QM. The top line of boxes represents the QMS functions from the TMM while the bottom line of boxes shows related CHS functions. Solid arrows between QMS and CHS functions indicate that these functions could be entirely integrated. Dashes arrows indicate similarities between the functions of the two systems. However, some activities cannot be completely integrated but rather can be aligned, such as quality and CH policies. In these cases, they need to exist as sub-processes of the overall combined QM/CH system.

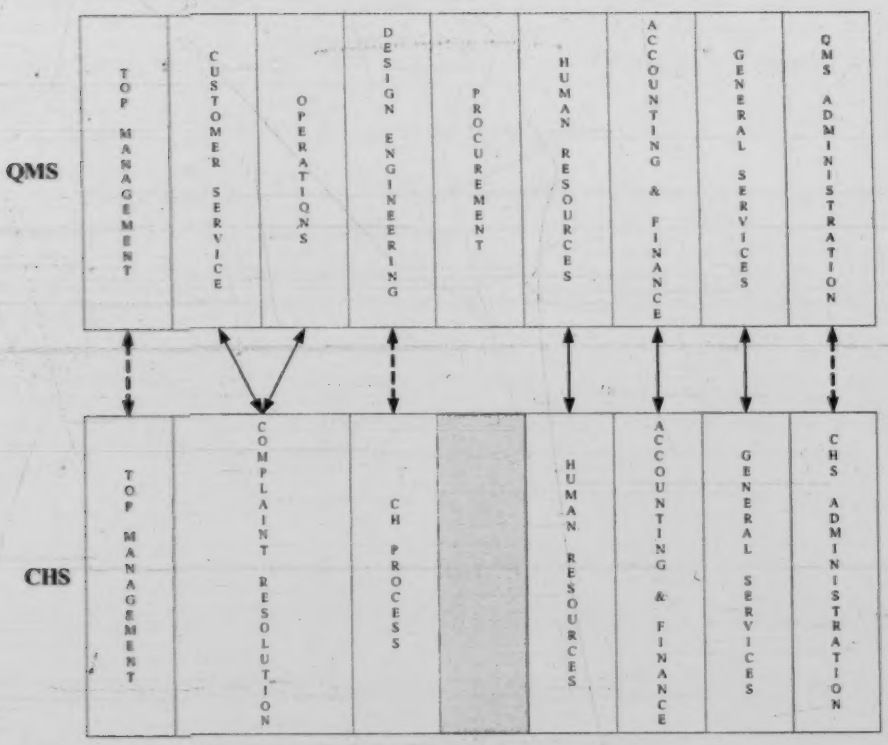

Figure 5-12: QMS & CHS Integration

Figure 5-13 further expands on the relationship between top management of a QMS and a CHS. As can be seen from the figure, for instance, certain components of a QMS's policy, objectives, and audits can be expanded to also form the framework of a CHS. Therefore, responsibilities of top management from both systems can be integrated by identifying the components of each system and aligning them based on their similarities and interactions, contributing to the same overall goal.

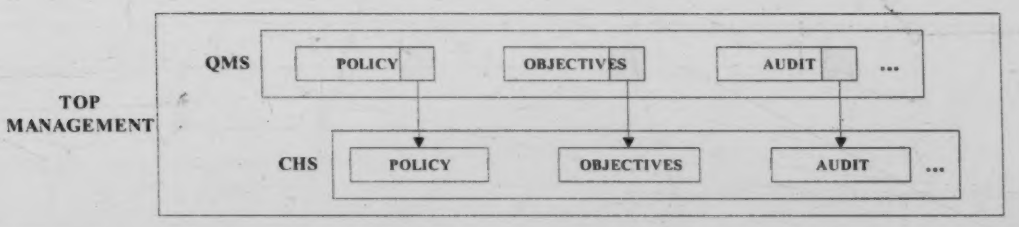

Figure 5-13: Examples of Top Management Integration

5.6 Summary

Among the sections of this chapter, the ISO 10000 family of standards was interpreted and its value to providing customer satisfaction and improvement opportunities was shown. A representation based on the sections of ISO 10002:2004 was drawn to show how this standard could be applied to the CHS of an electrical utility. Beyond that, linkages between QM and CH were illustrated and a model based on functional areas from both management systems was developed. The next chapter will go into more depth on the topic of CH and QM and apply ISO 10002:2004 and its integration with ISO 9001:2000 to the CSU.

6 Complaints Handling Case Study

6.1 Introduction

Aside from the chance of applying ISO 9001:2000 to an electrical utility, the CSU also provides a unique opportunity for CH research. Since ISO 10002:2004 is the first published international CH standard an assessment of the CSU's CHS in regards to this standard will be a first of its kind. The following chapter will:

- detail the CSU's current CHS,
- present a gap analysis of the CSU CHS and ISO 10002:2004, and
- show opportunities for integrating the CSU's QMS and CHS to provide CS.

6.2 Case Study Utility's CHS

The CSU, legislatively bound to maintain a complaint registry, established a CHS in 2000. Consequently, unlike QM, the CSU has a formal management structure in place for CH. However, the CHS has not been established according to a detailed set of guidelines such as ISO 10002:2004. Legislative requirements merely state that the CSU must record all complaints it receives and provide proof if and how each complaint is resolved. Therefore, it is interesting to learn how a CHS has grown in the CSU based on this sparse guidance and if and how it compares to ISO 1002:2004. Figure 6-1 provides an overview of the complaints received by the CSU during 2003. As can be seen from the graph, dissatisfaction with billing and rates contributes to the largest percentage of complaints, followed by problems with customer service quality and collections. The "other" category includes complaints involving tree trimming, and street lighting.

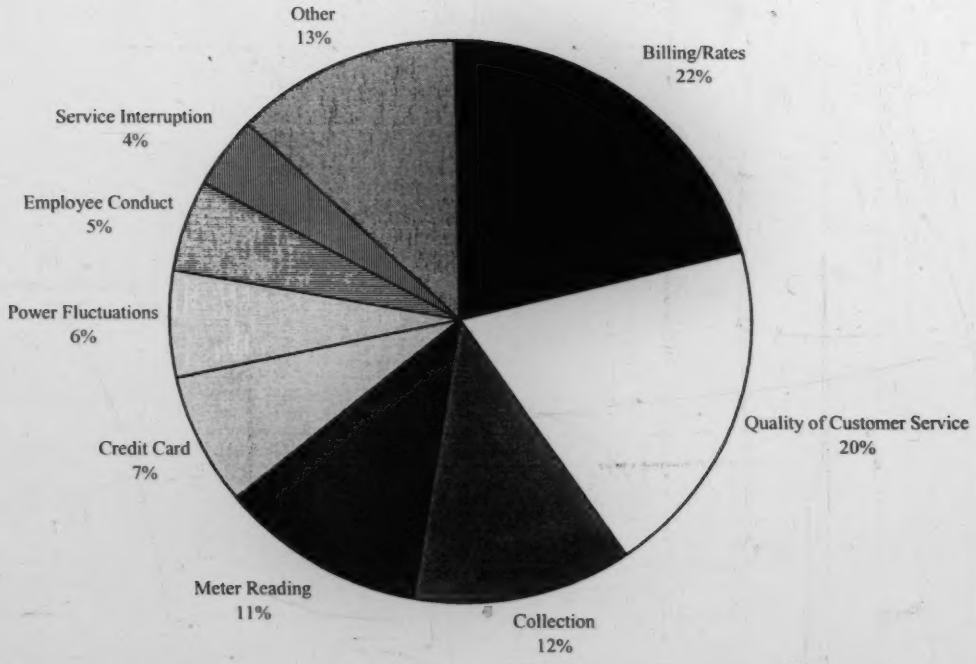

Figure 6-1: Distribution of Complaints in CSU

6.2.1 CHS Case Study Process

The guidelines provided in ISO 10002:2004 were used to determine the CHS's current status in regards to the standard. As presented in the CHS model in Figure 5-8, there are five main sections of the standard and a further description of the guidelines associated with each of the standard's sections is provided in Table E-1 of Appendix E.

When analysing the CSU's expansive and informal QMS, a lot of time was spent defining the scope of the system and determining what areas of the organisation to investigate. With the CHS however, the same process is utilised throughout the

organisation. Therefore, in comparison with the CSU's QMS investigation, the identification of functional areas was not required and fewer interviews were performed.

Information regarding the CHS was gathered from the CSU's intranet and an interview with the CHS management representative. The QMS case study also proved to be valuable. A section of the flowchart in Figure A-5 of Appendix A shows the CH process used by the Customer Contact Centre. The CSU also maintains a central database repository to support the CHS. This database records and tracks the majority of complaints received by the CSU and is also used as an administrative tool for assigning complaint resolution responsibilities and for gathering data for reporting. Not every complaint however is registered in and administered through this database. The CSU allows some flexibility in the method used to handle complaints and some departments that receive minimal complaints record their resolution through other means, such as paper copies or electronic text files.

Once information regarding the CHS was collected, I mapped out the overall process in a flowchart which proved useful in identifying the flow of information, activities, and responsibilities of the CHS. I also compiled to summarise the current CH activities in relation to the section guidelines of ISO 10002:2004. To conclude the case study, the gap analysis and a list of suggestions were developed to assist in improving the effectiveness of the CSU's CHS. With this overview complete, the following figure illustrates the overall CHS case study process.

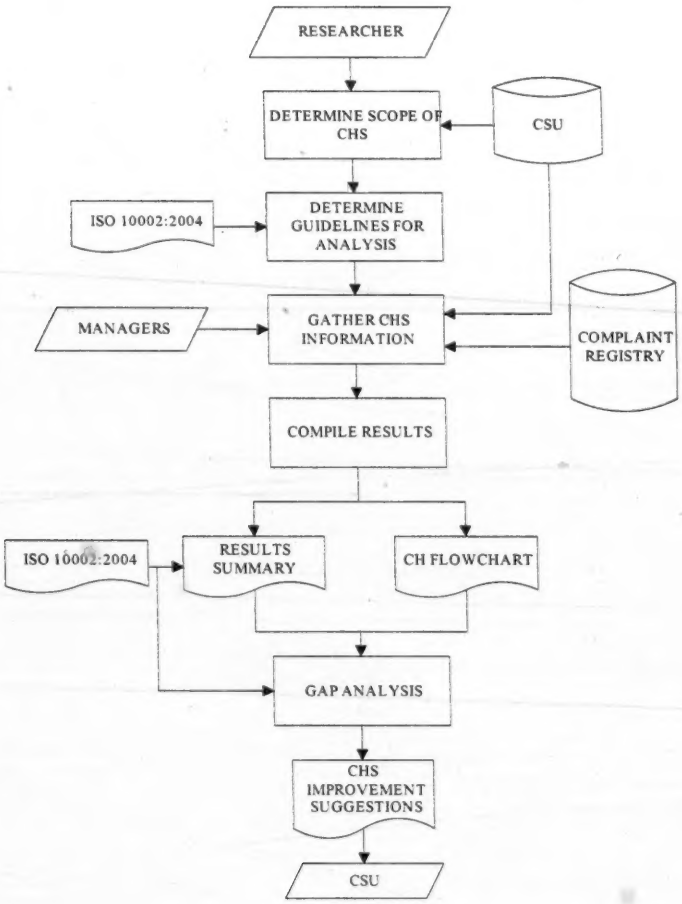

Figure 6-2: CHS Case Study Process

6.2.2 CHS Case Study Results

Results from investigating the CHS have been related to the two main objectives of CH and also ISO 10002:2004 guidelines. I took this approach to illustrate how the CSU's CHS fulfilled the fundamental roles of complaint resolution and improvement and to also show the detail and effectiveness of the system itself. Figure 6-3 depicts the overall CH process. The flowchart has been broken into activities relating to complaint resolution and improvement. For the activities relating to improvement, some of the boxes and

arrows appear in a dashed line format. Table 6-1 summarises how the results of the CSU's CHS investigation align with ISO 10002:2004.

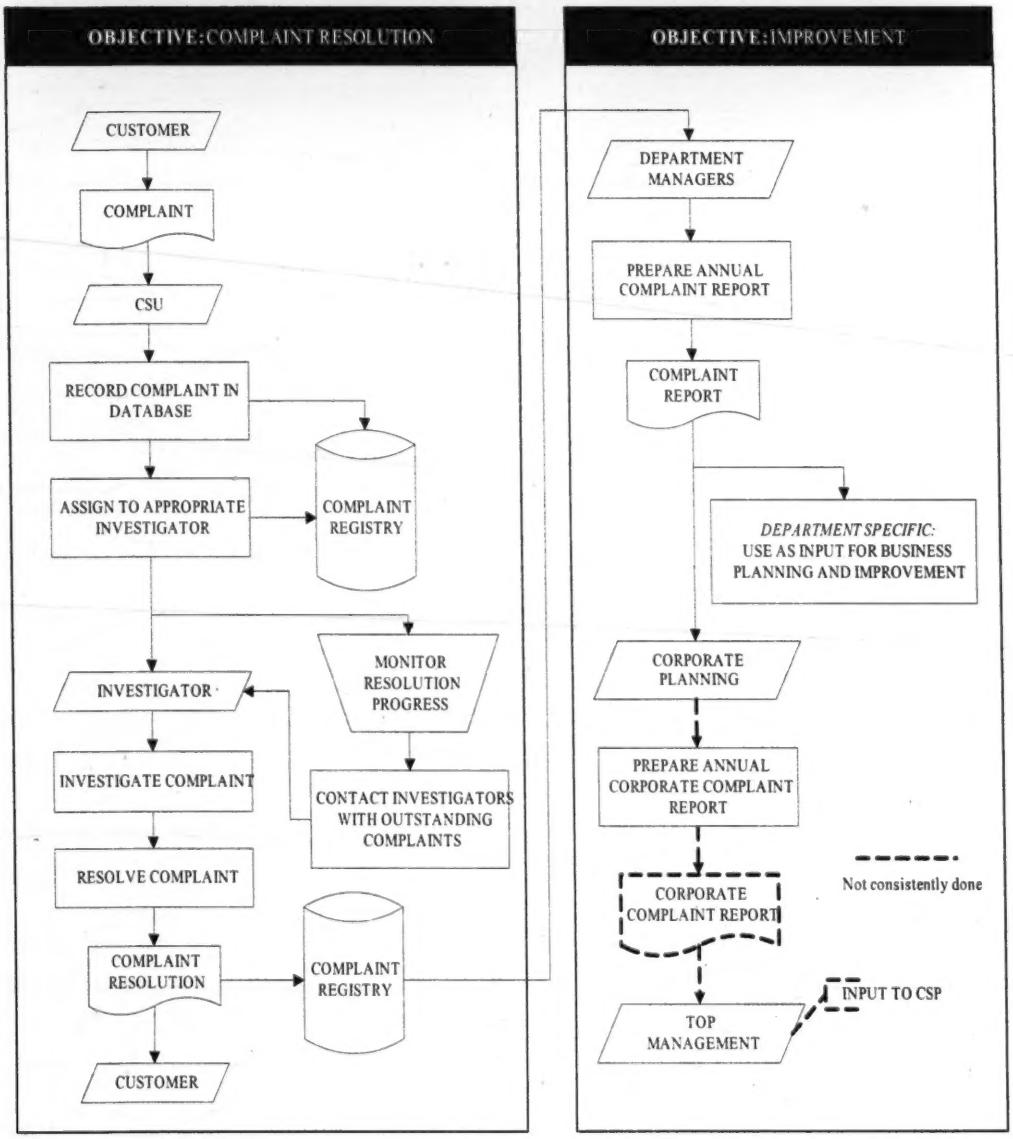

Figure 6-3: CSU's current CH process

Table 6-1: Results of CSU's CHS Case Study

ISO 10002:2004	Section Guidelines	CSU Activities
4. Guiding Principles	4.1 General	The CSU has not established formal guiding principles for its CHS. However, incorporated within the CSU's six corporate operating principles are references to customer focus and continual improvement. Lodging complaints is free of charge and can be done through e-mail, postal mail, fax, telephone, or in person.
	4.2 Visibility	
	4.3 Accessibility	
	4.4 Responsiveness	
	4.5 Objectivity	
	4.6 Charges	
	4.7 Confidentiality	
	4.8 Customer-focused approach	
	4.9 Accountability	
	4.10 Continual improvement	
5. Complaints-handling framework	5.1 Commitment	- Legislatively required to maintain a complaints registry - Top management is not always visible promoting CH - Departmental managers appear committed to CH
	5.2 Policy	- Established CHS corporate policy (complaint definition, responsibilities, reporting target, complaint register) - Policy related to corporate goal of improving financial strength.
	5.3 Responsibility and authority	- Policy has section detailing department manager responsibility - CH management representative has been assigned.
6. Planning and design	6.1 General	A formal CH process exists
	6.2 Objectives	A target of 100% reporting all complaints received
	6.3 Activities	CH feedback theoretically an input to business planning and quality improvement. Practiced by some areas of the CSU (not enforced)
	6.4 Resources	- Database established to store and administrate complaints - Department managers responsible for CH in department - CH management representative has been assigned - No formal CH employee training is established

Table 6-1 Results of CSU's CHS Investigation (Continued)

ISO 10002:2004	Section Guidelines	CSU Activities
7. Operation of complaints-handling process	7.1 Communication	- Complaints can be received at any customer/CSU interface(Contact Centre, Public Relations, District Offices receive the highest volume) - CSU contact information is widely publicised
	7.2 Receipt of complaint	- All complaints are recorded in either the corporate complaint registry or in a department specific complaint tracking tool - Complaints are received by e-mail, fax, phone, letter, in person
	7.3 Tracking of complaint	Current complaint status tracked through corporate complaint registry
	7.4 Acknowledgement of complaint	Complaints are acknowledged when received
	7.5 Initial assessment of complaint	Complaints assigned (through e-mail) to an appropriate individual for investigation
	7.6 Investigation of complaint	All complaints are investigated
	7.7 Response to complaints	The CSU attempts to respond to all complaints. However, when I was searching through the complaint registry, a number of complaints were still open from previous years.
	7.8 Communicating the decision	Complaint resolution is recorded, appropriate parties are notified
	7.9 Closing the complaint	Complaint status, including closure tracked in complaint registry
8. Maintenance and improvement	8.1 Collection of information	- Received complaints are recorded and kept on file for six years - Annual reports are prepared by department managers
	8.2 Analysis and evaluation of complaints	- Classified by date, type, geography, department where received - Department annual reports supposed to include trends, actions
	8.3 Satisfaction with the CH process	No CH process satisfaction measurement is performed
	8.4 Monitoring of the CH process	No official CH process monitoring is performed
	8.5 Auditing of the CH process	No CH process auditing is performed
	8.6. Management review of the complaints-handling process	- Top management does not perform a formal CHS review - CH information theoretically feeds business planning, improvements. At operational level, this appears to happen.
	8.7 Continual improvement	No formal CH improvement initiatives have been implemented

6.3 CHS Case Study Gap Analysis

Based on the CSU's high CS rating, it can be assumed that it is doing a good job of dealing with complaints to minimise customer dissatisfaction. However, there are some areas for further development, particularly in using feedback from complaints to assist in improving the CH process and in turn organisational performance. With this in mind, the following table summarises some suggestions arrived at by analysing differences between current CH activities and the ISO 10002:2004 guidelines for an effective CHS. The text following the gap analysis table further describes these suggestions.

Table 6-2: CHS Case Study Gap Analysis

ISO 10002:2004 Sections	Gap
4. Guiding Principles	Top management has the opportunity to either formally establish a set CH guiding principles or integrate them with the CSU's operating and/or quality principles
5. Complaints-handling framework	- Top management could play a more visible role in promoting CH and assume more official responsibility - Development of formal training/awareness program - Opportunity to align CH policy with a QM policy if the QMS becomes formalised
6. Planning and design	- Establishment of formal CH objectives - Identify possible links with other CSU activities - Establish procedures, documentation - Ensure all employees are trained in CH processes
7. Operation of complaints-handling process	Mostly adheres to ISO 10002:2004 guidelines
8. Maintenance and improvement	- Analysis and reporting of aggregate CH information - Entire CSU using central complaint registry - CH process satisfaction survey - Develop measures to monitor CH process - With formal CH procedures and objectives established, audits of CH process can be performed - Establish formal CH management review - Quality improvement initiatives to improve CHS

6.3.1 Guiding Principles Results

Among the CSU's operating principles is mention of customer focus and improvement, which are two of the guiding principles suggested by ISO 10002:2004. Therefore, there is an opening for top management to either further develop these operating principles or perhaps explicitly state a sub-set of operating principles for CH. For example, one of the CSU's operating principles relates to the practise of continuous improvement through ongoing coaching, learning, and innovation, with a focus on the needs and wants of internal and external customers. In ISO 10002:2004, one of the guiding principles is continual improvement, and states that "the continual improvement of the complaints-handling process and the quality of products should be a permanent objective of the organisation". Clearly therefore, there are opportunities for the integration of principles.

6.3.2 Complaints-Handling Framework Results

When the CHS was initially established, the CSU's top management was visible in promoting its success. With the implementation of this system complete, top management has further opportunities to promote its continued commitment to the CHS. A possible initiative could be the development of a formal training or awareness program to promote CH and its importance to improvement and CS.

Besides exhibiting initial commitment, management also established a corporate CH policy. This policy states:

> "Complaints from customers and other stakeholders are a way to gain insight into work processes and identify opportunities for process improvement. As part of the Corporate Strategic Goal to improve corporate financial strength and

consistent with legislative requirements, [the CSU] has adopted a strategy to learn from its complaints."

The policy goes on to prescribe the responsibility of department managers in the CHS, sets a 100% target for the recording of all complaints received, and requires that each department keep a complaint register. However, since both CH and QM contribute to CS, there is an opportunity to integrate their related policies, showing linkages between the two management systems. Although the CSU does not currently have a quality policy, its development can be linked to the CSU's CH policy. QM and CH can also be related to the CSU's goal of providing customers with exceptional value. Integrating the two management system objectives could prove beneficial for helping the organisation capitalise on synergy and increasing customer focus.

6.3.3 Planning and Design Results

The CSU has defined the operation of its CH process. Complaints are routinely resolved and tracked in adherence to legislative requirements. Little focus however has been given to using this information for improving the CH process itself or other organisational processes. Among planning activities, measurable objectives should be established to ensure the CHS is maintaining and hopefully improving its performance and also to ensure the management system is beneficial to the organisation itself. There is also an opportunity to plan and design CH activities to link with other CSU processes, especially in relation to QM.

6.3.4 Operation of Complaints-Handling Process Results

Figure 6-4 illustrates the gap analysis in the area of CH process operations. From investigation, it was shown that the CSU follows most of the guidelines laid out in section seven of ISO 10002:2004. Figure 6-4 shows the core of the CH model presented in Figure 5-8 and then compares it with the CSU's CH process. The steps outlined in ISO 10002:2004 have been overlaid on the CSU's process to illustrate adherence. One suggestion for the CSU is for it to use one central complaint registry only. The CSU's CH policy allows for flexibility in the registry each department uses, but one central repository would be more effective in tracking all the complaints the CSU receives. Appendix F illustrates the complaint information collected by the CSU and shows how the complaint is tracked through the CH process.

6.3.5 Maintenance and Improvement Results

Perhaps the biggest benefits can be realised from changes to the maintenance and improvement of the CSU's CHS. As Figure 6-3 showed, theoretical management structures exist for using CH feedback, but little action is actually taken. Aggregate complaint reports are valuable inputs into business planning and identification of improvement opportunities. With the CHS in operation since 2000, there will now be enough historical data to establish meaningful customer complaint trends to assess CS gains and losses. Also, as suggested by the ISO 10002:2004 guidelines, customer satisfaction surveys and audits of the CHS are also valuable assessment tools. However, merely assessing effectiveness is not enough. Resources should be made available for improvement initiatives to enhance the CHS and other associated systems and processes.

A search for references to complaints was performed on annual reports of fifteen prominent Canadian electrical utilities. Interestingly, only one utility, BC Hydro, made mention of complaints. For the first time, in its 2004 annual report, this utility stated the number of complaints received at or escalated to the vice-president management level and also noted a lack of benchmark data for this measure (BC Hydro 2004 Annual Report). It therefore appears that this is an area for further development.

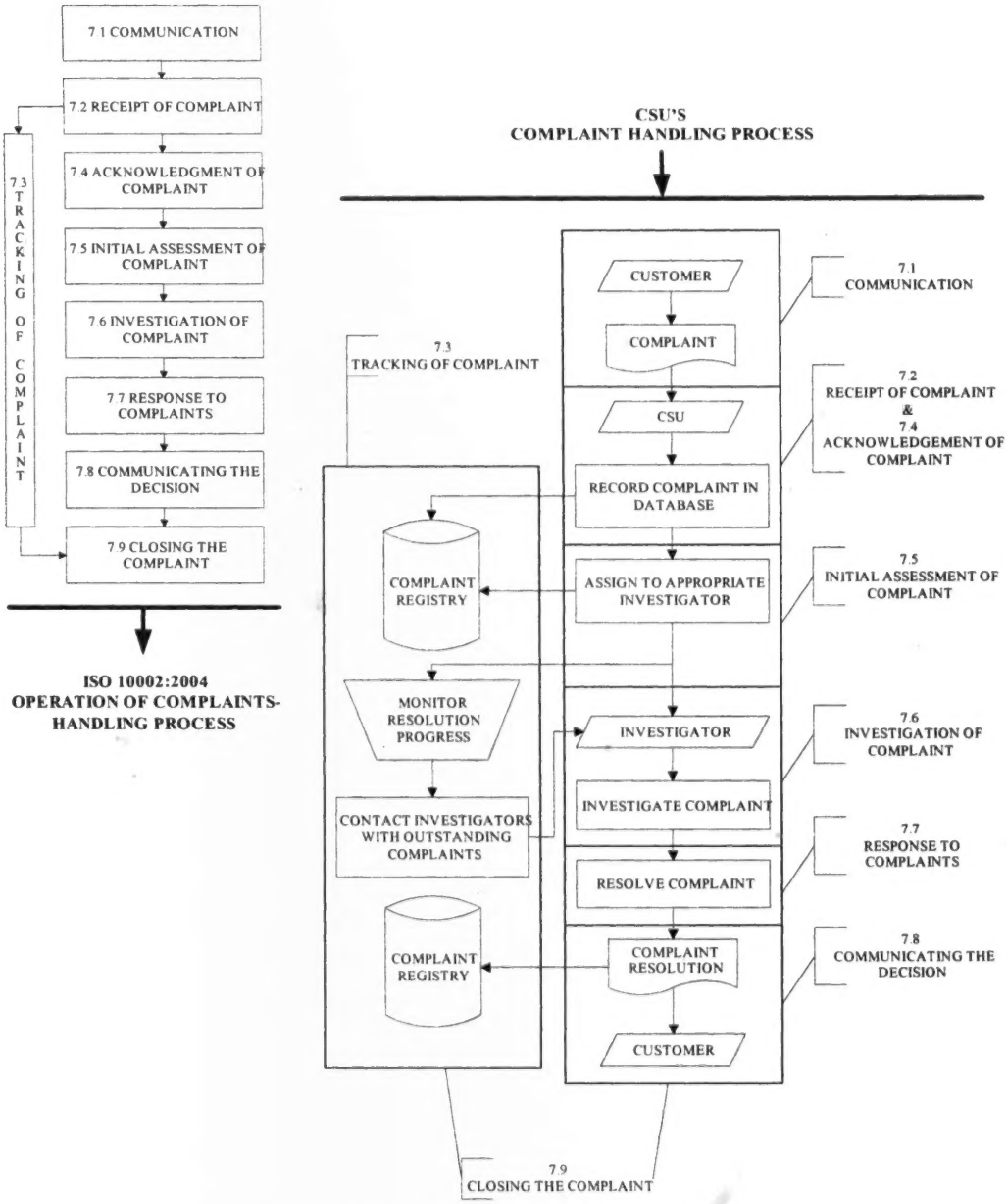

Figure 6-4: Gap analysis of CH process

6.4 Integration of QM and CH in the CSU

Chapter Five showed opportunities for integrating the main functions of a QMS and CHS. Table 6-3 acts on these openings and describes how the main CHS functions shown in Figure 5-12 can be integrated with the CSU's QM activities.

6.5 Summary

The concluding chapter of original work of this thesis looked primarily at the CH process in the CSU and compared this process against the guidelines provided in ISO 10002:2004. The key issue was the lack of follow-up of complaint feedback by the CSU. An additional contribution to this chapter was the integration of CH and QM and the illustration of how these two management systems can work together in the CSU to provide CS.

Table 6-3: QM and CH Integration within the CSU

Function	Integration Opportunities
Top Management	- QM and CH are closely related through CS so aspects of the quality policy and objectives can be expanded to develop a CH policy and a list of CH objectives. - Align responsibilities and objectives of QM and CH management representatives. - A component of a QMS audit can assess the CSU's CHS. - Some of the CSU's quality performance indicators can directly assess the CHS.
Complaint Resolution	Complaints can result from any operation within the CSU. Therefore, complaint resolution can be the responsibility of any QMS function and is dependent on where the cause of the complaint occurred. This is the best opportunity for integration because it involves all functions and resources within a QMS and should lead to its overall improvement. For example, establishing communication channels throughout the QMS to transmit information on the matter in which complaints are resolved and details on their causes is not only beneficial to the QMS but also fosters integration.
CH Process Development	This function would likely not be performed by design engineering since they are primarily interested in technical projects. Therefore, this function would likely be performed within the Customer Service & Marketing or CHS Administration departments. However, the same requirements for design planning, review, validation, and verification can be followed.
Human Resources	Human Resources assists in providing resources for all functions of the CSU. Therefore, inherent in Human Resources practises should be the identification and development of employees to manage and operate the CHS. A suggestion would be the establishment of or awareness for CH training in the CSU.
Accounting & Finance	Support given to the QMS can also be distributed to the CHS. Budgeting and participation in quality improvement projects would also assist the CH process.
General Services	The CHS requires infrastructure related to a business setting. General Services has process set up for acquiring these resources and supports all management systems within the CSU.
CHS Administration	- The CH process is one of the processes of a QMS and therefore its documentation would be part of QMS documentation. - A section of the CSU's quality manual could address the CHS. - A section of the CSU's administration department could provide specific CHS guidance and organisation. - Feedback from complaints should be considered for every quality improvement initiative. - CHS assessment and review can be done by a dedicated CHS team or can be incorporated as a component of regular QMS review.

7 Conclusions

With the presentation of background information and the original work completed, this chapter concludes the thesis by listing the contributions of the research, its limitations and finally recommends topics for future work.

7.1 Contributions of the Research

In Chapter Three, top management activities in an electrical utility were interpreted and it was shown how these activities relate to the requirements listed in ISO 9001:2000. Also developed in this chapter was a model entitled the ISO 9001:2000 Top Management Model (TMM). The intent of this model was to assist top management in electrical utilities in establishing and maintaining a QMS compliant with ISO 9001:2000 requirements.

Subsequently, a case study of the CSU's QMS was illustrated in Chapter Four. Included in the case study was a description of the CSU's current QMS. A gap analysis was prepared comparing the CSU's QMS with the TMM guidelines. A list of suggestions to assist the CSU in obtaining ISO 9001:2000 registration was also provided.

A particularly important facet of QM, namely CH, was addressed in Chapter Five. Specifically, the ISO 10000 family of standards and their relationship with QM and CS were focused on. A model based on the sections of ISO 10002:2004 was drawn to show how this standard could be applied to the CHS of an electrical utility. An illustration of

integration opportunities between the functions of a QMS and a CHS, that concludes the chapter, contributes a new dimension to research on integrated management systems.

Finally, a case study comparing the CSU's CHS with ISO 10002:2004 guidelines was demonstrated in Chapter Six. The current status of the CSU's CHS was assessed and suggestions for improvement were offered. Possibilities for QMS and CHS integration within the CSU were also addressed.

7.2 Limitations of the Research

Due to the sheer size of the CSU and the research project time limits, it was not possible to do a complete QMS audit. Instead, a select group of people, primarily managers, was interviewed and a gap analysis of the CSU's QMS and the requirements of ISO 9001:2000 was prepared. A further, more detailed analysis of the CSU's QMS would require a full scale audit and would involve interviews with and observations of operational level employees from all functional and geographical areas of the organisation.

The CHS in place at the CSU was not developed in accordance with ISO 10002:2004 guidelines since this standard was only published during the writing of this thesis. Therefore, an audit of the CSU's CHS was not possible since employees in the CSU were not aware of the standard during the CHS's development. A gap analysis between ISO 10002:2004 and the CSU's CHS was prepared, in effect facilitating the validation of the standard itself. With the publication of the standard and its infiltration among the

business community, future analysis of the CSU's CHS should utilise an audit which would more fully assess the CHS and its adherence to the ISO 10002:2004 guidelines.

7.3 Scope for Further Research

During this research project several areas for further investigation were highlighted. Specifically, the following recommendations can be made for the CSU:

- Investigate the possibility of applying other management systems in the CSU.
- Implement improvement suggestions for the CSU's QMS and CHS.
- Implement ISO 9001:2000 and ISO 10002:2004 within the CSU.
- Apply the ISO 10001 and ISO 10003 standards to the CSU.

In addition, the following recommendations can be made for general research in these areas:

- Assess the effectiveness of the 2000 version of ISO 9001 in electrical utilities.
- Develop performance indicators to measure the effect CH has on CS.
- Explore opportunities for integrating CH and TMM within an EMS.
- Assess whether improvement has resulted in using complaints handling feedback.

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Appendix A: Case Study Data

A-1: **Employee Survey**

A-2: **Customer Satisfaction Survey**

A-3: **Purchasing**

A-4: **Design Engineering**

A-5: **Customer Service Operations and Contact Centre**

A-6: **Quality Improvement Initiative**

A-7: **Public Affairs**

A-8: **Human Resources**

A-9: **Engineer-in-Training Program**

A-10: **Meter Shop**

A-11: **Business Communications**

A-12: **Internal Audit**

A-13: **Information Technology Services**

A-14: **Corporate Facilities**

A-15: **Corporate Finance & Administration**

A-16: **Business Planning**

Table A-1: Employee Survey Results

How was the Employee Survey developed? Is the survey regularly reviewed and revised?
The initial survey was developed by the Case Study Utility (CSU) and an external consulting firm After conducting the survey, it was decided that the questionnaire was too long and detailed. The survey has since been revised to comprise of twenty questions focusing on: Workplace Culture Your Work Overall View of Company Employee Comments
Who is responsible for administration and compiling/communicating results?
The Corporate Planning &Development (CP&D) division distributes the survey to all employees (either on paper or electronically) Employees complete the survey and forward results to an external consulting firm The external consulting firm compiles the survey results and categorises employee comments. This is done to ensure participants remain anonymous CP&D receives and communicates survey results – posted on company's intranet.
What are the results of the survey used for? Are comparisons done between years to determine if results have improved or if problems still exist?
Initial idea for survey was to provide an informal means to help managers know what was happening in their areas and how employees felt about their work Managers are *encouraged* to develop Action Plans based on the survey results for their area - they are not formally made accountable for actions plans Current survey results are compared with previous years' results No formalised corporate measures in place to measure employee satisfaction. However, theoretically results from the employee survey are to feed into business planning

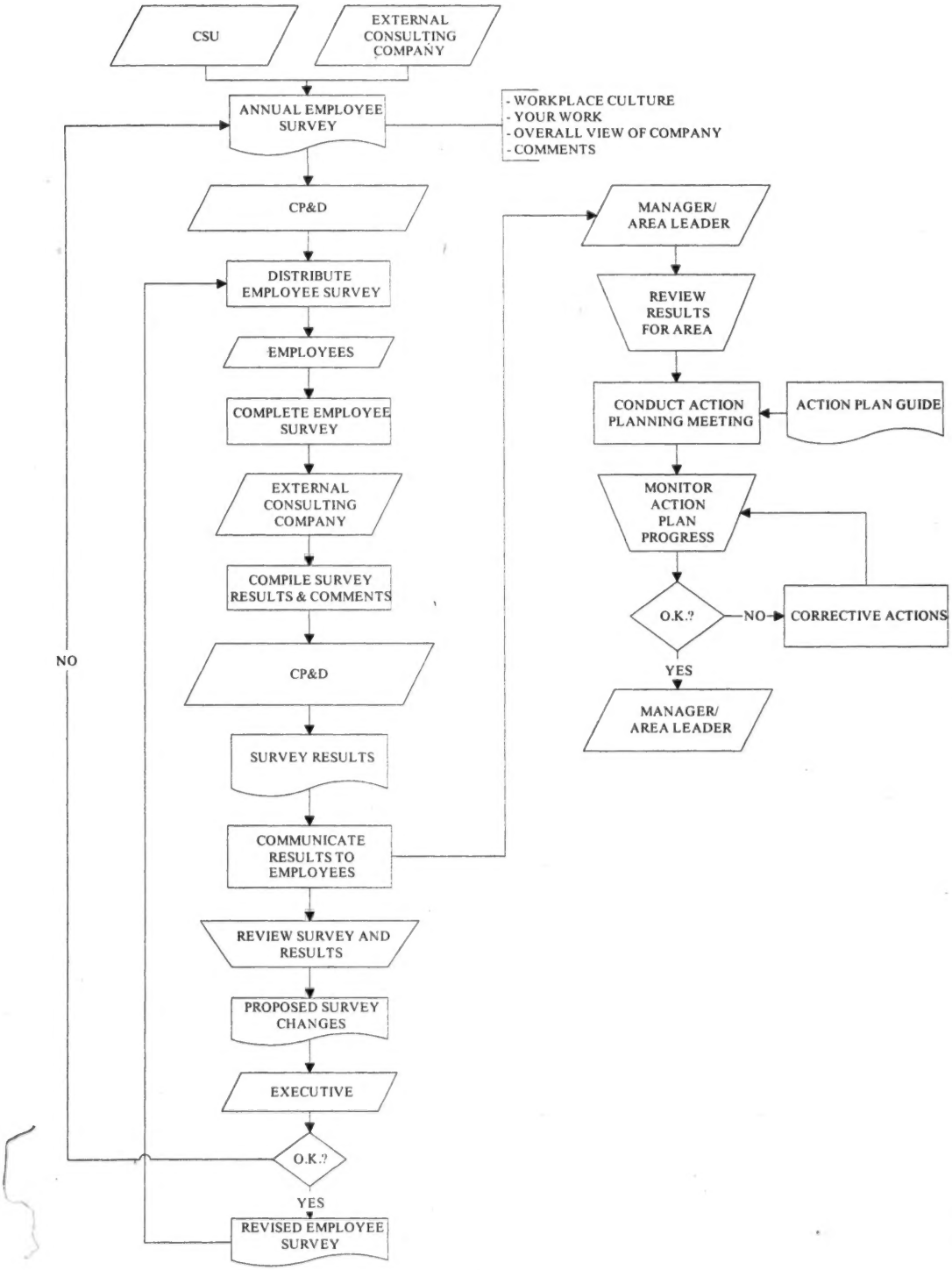

Figure A-1: Employee Survey Process

Table A-2: Customer Satisfaction Survey Results

How was the Customer Satisfaction Survey developed, reviewed and revised?
- Survey was initiated in 1999 by Customer Service & Sales division. - Performed quarterly - Looked at what was done before for guidance (e.g. CEA Survey) - Sections of survey: a. Customer Satisfaction b. Corporate Citizenship c. Corporate Image d. Special Topic –request to survey customers about a special project, program (i.e. automated answer service for outages) - Questions reviewed quarterly for their applicability – look at historical information. - Survey not approved by Executive – belongs to Customer Marketing & Sales Division.
Who is responsible for administering the survey and reporting results? **What is the average response rate? Are there initiatives for improvement?**
Administration: - 10 point scale, random sampling - Conducted over telephone by external company - Require 500 completed questionnaires. Track refusal rate and response rate (including # busy signals, no answers, language barriers, etc.) - No work is currently being done at improving response rate Results Compilation: - External company prepares initial results - Customer Marketing & Sales division prepares quarterly report on findings - Report has been revised and is now shorter and more readable - Control limits included with results to show historical (acceptable scores) to reduce panic, etc. if results change - Report indicates if measures increase or decrease dramatically – helps to show where action should be taken Results Communication: - Report available upon request (distribution list) – currently not distributed corporate wide or available on line - Some conclusions provided, surmising about why results changed, etc.
What are the survey results used for – are they valuable for planning purposes? **Are comparisons done between quarters to identify improvements/problems?** **Is the information compared with other organisation results?**
- Results used strategically and operationally. - Strategically – feeds into Goals & Measures – quarterly executive management review. - Operationally, used as a tool to assist in improvement. - Managers not held accountable to act on problem areas in survey – survey administrators believe links between survey and actions taken are weak. - Results compared with CEA survey, which uses similar questions/format. - Results compared with previous surveys.

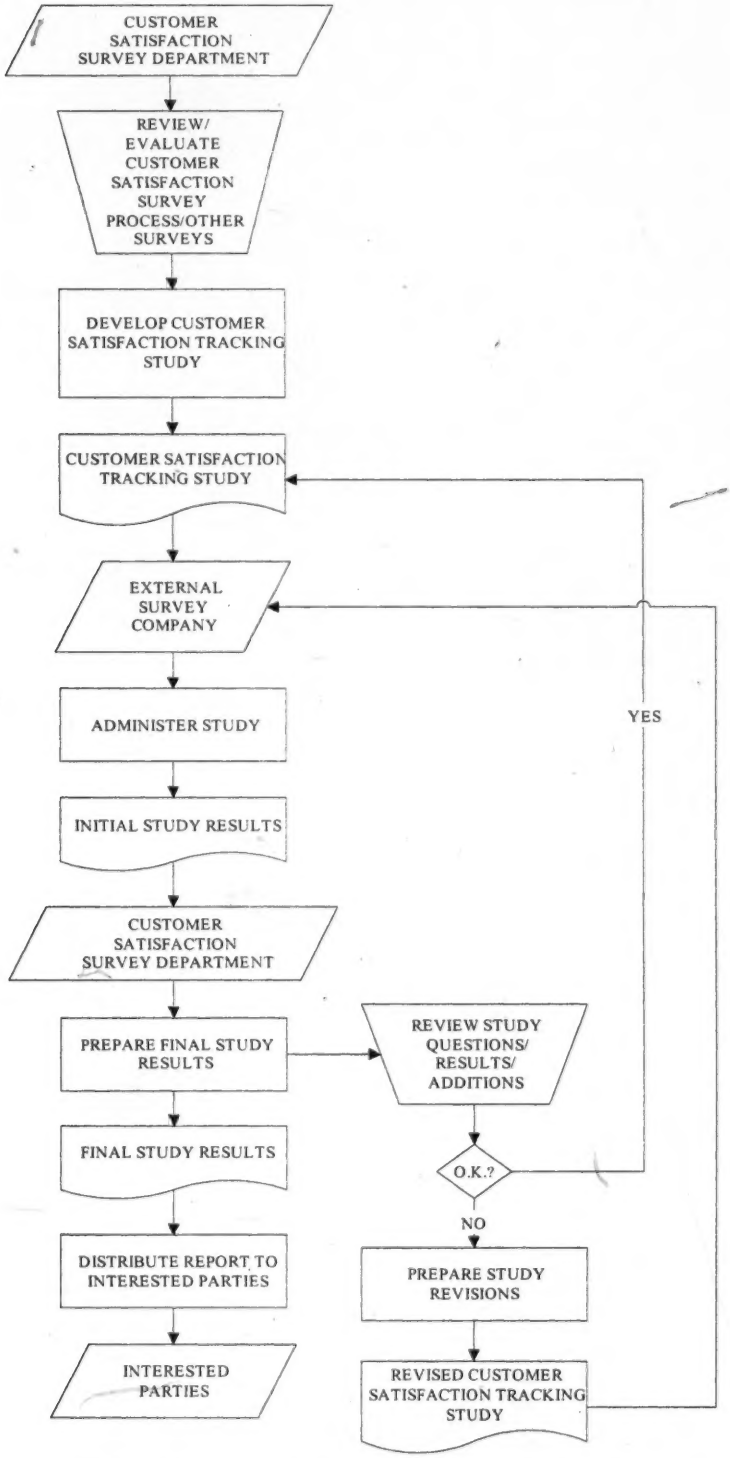

Figure A-2: Customer Satisfaction Survey Process

Table A-3: Purchasing Results

What is the structure/history of the Purchasing function?
- Past: purchasing function was split across business units. - Sept. 2002: purchasing function amalgamated with process ongoing - Resides in Finance & Administration Business Unit
How are purchased goods/services evaluated with respect to their impact on the quality of the final product?
Department divides goods into three classes – A,B,C - *Class A*: critical to final product a. Specification stringent b. Vendors often pre-qualified (i.e. may have to have ISO 9001:2000 certification or be able to demonstrate compliance) c. Prior to delivery, product may have to undergo tests with CSU inspector to witness test - *Class B:* middle level of criticality or commonly purchased good a. Listing of pre-approved suppliers/parts = **M**aterial **E**quipment **D**ata **S**heets b. Suppliers undergo tests, provide samples, etc. for qualification c. Lists criteria for incoming inspection d. Rejected material returned to vendor. If persistent problem, management becomes involved to resolve issue - *Class C:* smaller value items a. Items generally used for maintenance, repair, and operation
What systems are used for tracking material and material specifications?
- All purchasing, receiving, and inventory control transactions are done through SAP - Product specifications are linked to SAP. Specifications include what the vendor has to supply and what incoming inspection needs to be performed. - Corporate policies have been developed to address purchasing practices.
What is the overall purchasing process?
A need for material is initiated. Depending on the product, it can be: - Purchased directly with the use of a Corporate Credit Card - Retrieved from central stores, if available - Purchased directly from vendor if an alliance (outline agreement) has been established - Allocated to purchasing department for bidding and eventual purchase
What communication exists between Engineering Design & Purchasing?
- Engineering Design supplies Purchasing with the appropriate specification and inspection requirements for purchased goods - For new/critical goods, engineering reviews bids for suitability and makes suggestions

Table A-3: Purchasing Results Continued

Are there any special programs/relationships with vendors?
- Alliances have been formed with some vendors. These alliances are for a set period of time, with the CSU guaranteeing to buy a set quantity of goods over the agreement – vendor given a forecast. - Primarily done when dealing directly with vendor; does not work as well when goods are moved through a distributor - The CSU looks for vendor improvements and sharing of information. One area of focus is for vendors to do most of the inspection themselves, therefore cutting down on incoming inspection costs.
Definitions: *Outline Agreement (O/A):* a contract set up between the CSU and a vendor. The contract stipulates numerous conditions of sale including price, terms of payment, delivery locations and responsibilities, projected annual volume and describes what items are covered by the agreement. *STO* = Stock Transport Order *P/O* = Purchase Order *P/R* = Purchase Requisition *G/R* = Goods Receipt

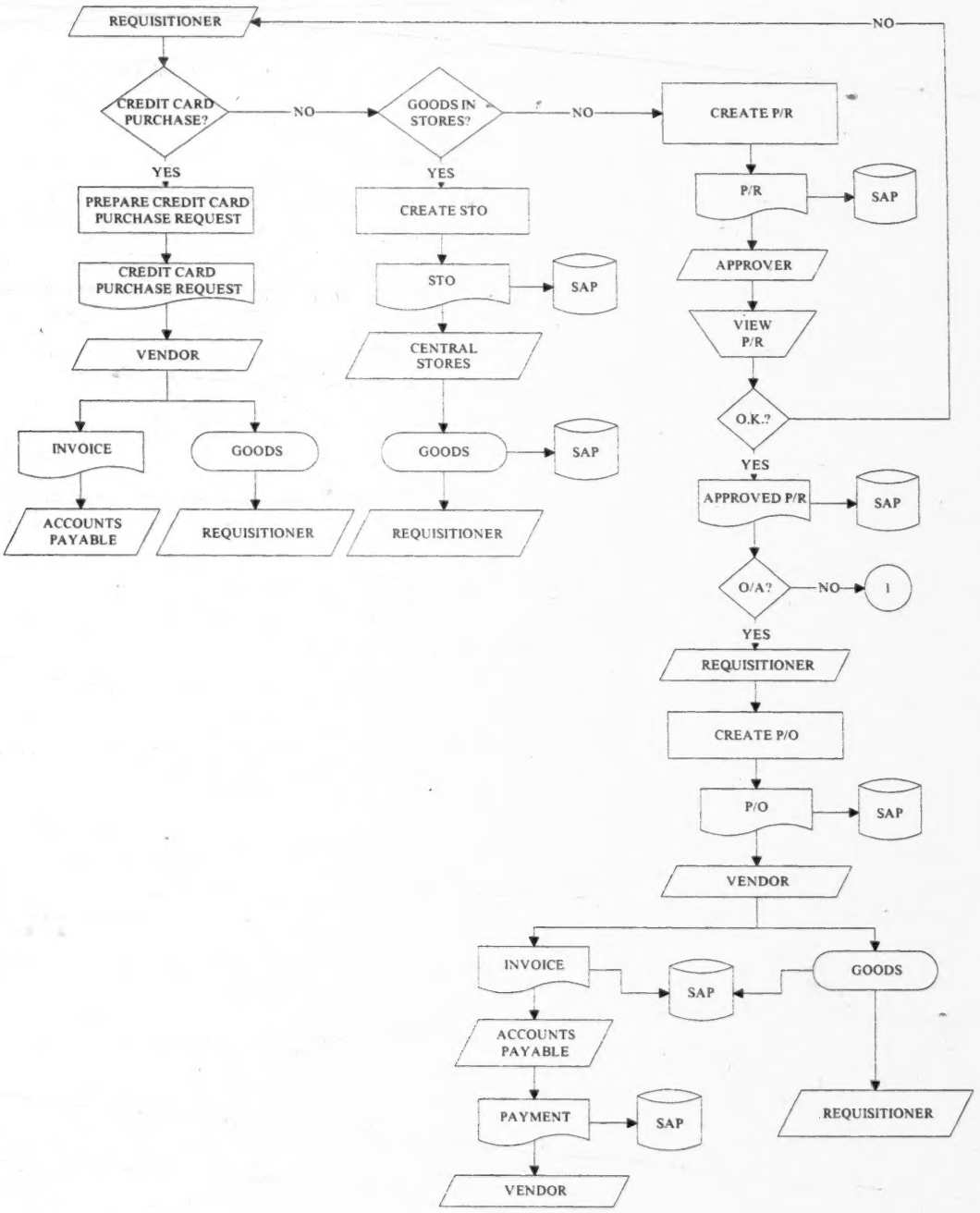

Figure A-3: Purchasing Process

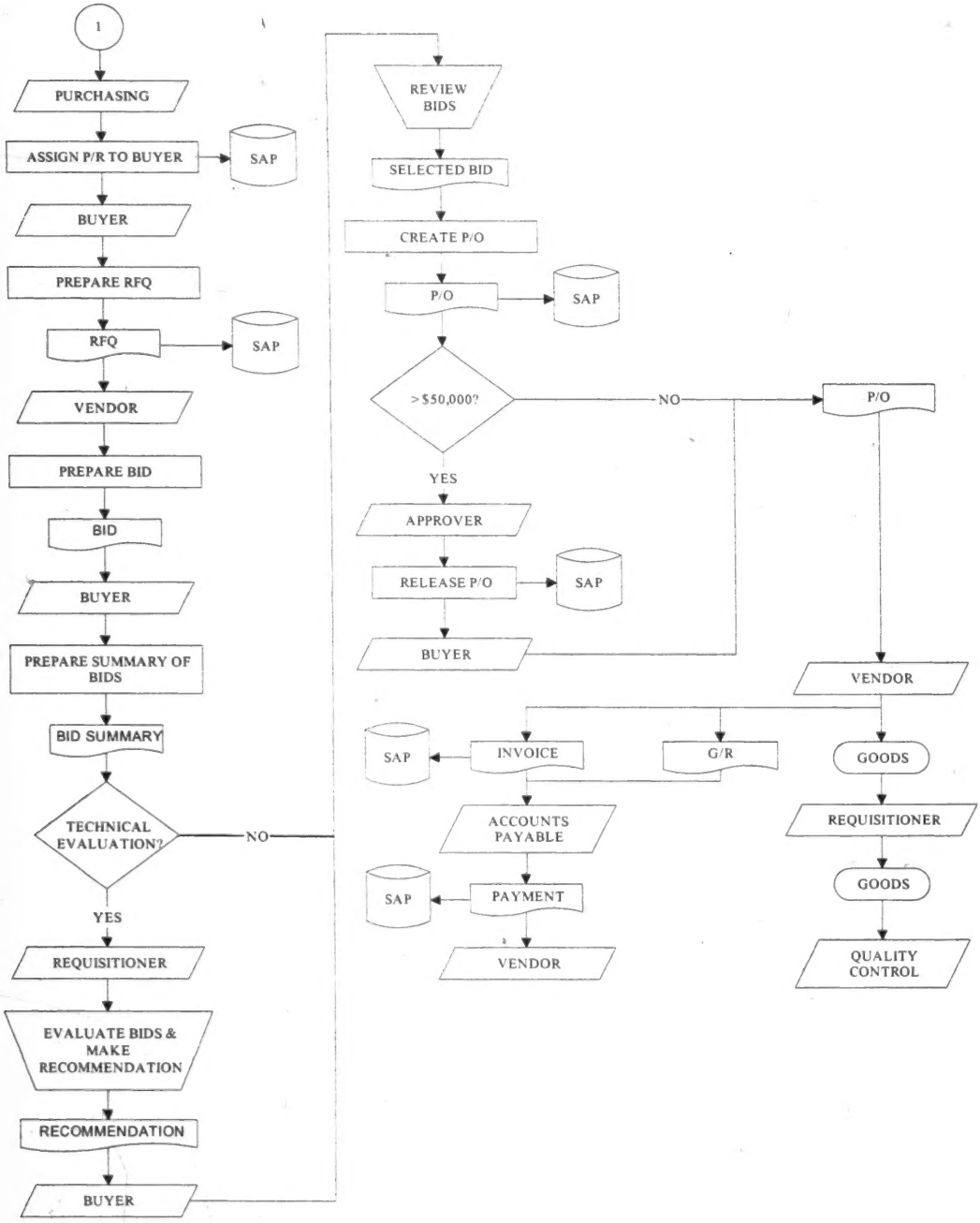

Figure A-3: Purchasing Process Continued

Table A-4: Design Engineering Results

(Electrical Engineering Department of Generation Business Unit)

What are the stages of an engineering design project?
Business Enterprise Planning: - Asset owner determines there is a problem - Works with maintenance engineering to see if problem can be resolved - If problem requires design change, approach Engineering Design - Determine type of project that is required - Develop Capital Project Justification - Approval from Executive Project Planning: - Project Manager appointed - Engineering functions are defined - Detailed concept design report developed, detailing scope, schedule and budget - Approval from asset owner Implementation: - Detailed engineering design, drawings, specifications - Feedback from customer - Acquire materials - Award tenders - Provide construction with drawings and draft O&M manuals - Construction of project - Commissioning - Project is released to asset owner Closure: - Issue Operation &Maintenance (O&M) manuals - Release drawings (with appropriate updates) - Address deficiencies – plan to fix with the least cost - Create "Lessons Learned" document
What responsibilities and ownership are assigned to a project?
For larger, multi-discipline projects, the project manager comes from the business unit's project department. A lead designer from each discipline is identified and all problems are channelled through this individual. (reactive) For smaller, single-discipline projects, the project manager will be from within the participating engineering department. The job planner (project manager) tracks dollars spent and milestones complete.

Table A-4: Design Engineering Results Continued

What project review is done?
- Review schedule - Review resources spent on project (project plan linked to SAP) a. If project is under-spent, it's a good indication that people are not working on it, which may affect the schedule - Large project – review meetings usually only scheduled if a problem becomes visible - Small projects – monthly departmental meetings address the progress of projects - Commissioning – verification and validation is performed - Scope definition & design – customer (asset owner) consulted for approval
What documentation is kept?
- "Lessons Learned" database - As-Built database and tracking (documentation control system – DCS) - Deficiencies Report
How are changes to design/project plans (schedule, scope, budget) dealt with?
- When a scope change is identified, a cost for this change is calculated - $1 million change needs to be reviewed/approved by executive - Before construction starts (still in engineering design phase), a project can be deferred if it is over-spent, etc. - If construction has started, the project will be completed regardless of problems
What are the interactions with the purchasing department?
- Smaller, less critical parts can be purchased directly by Engineering Design by the corporate credit card – Engineering Design does not find this a problem - Larger, critical parts are well controlled through the purchasing cycle – Engineering Design finds there is good communication between them and purchasing for this material - not a problem. - Engineering Design finds the purchase of middle critical parts can be a problem. Engineering Design provides technical specifications. Communication with purchasing can sometimes be weak – Purchasing may obtain parts that do not fulfil all specifications (without knowing so) and rework, other parts then have to be purchased, more money spent, etc.

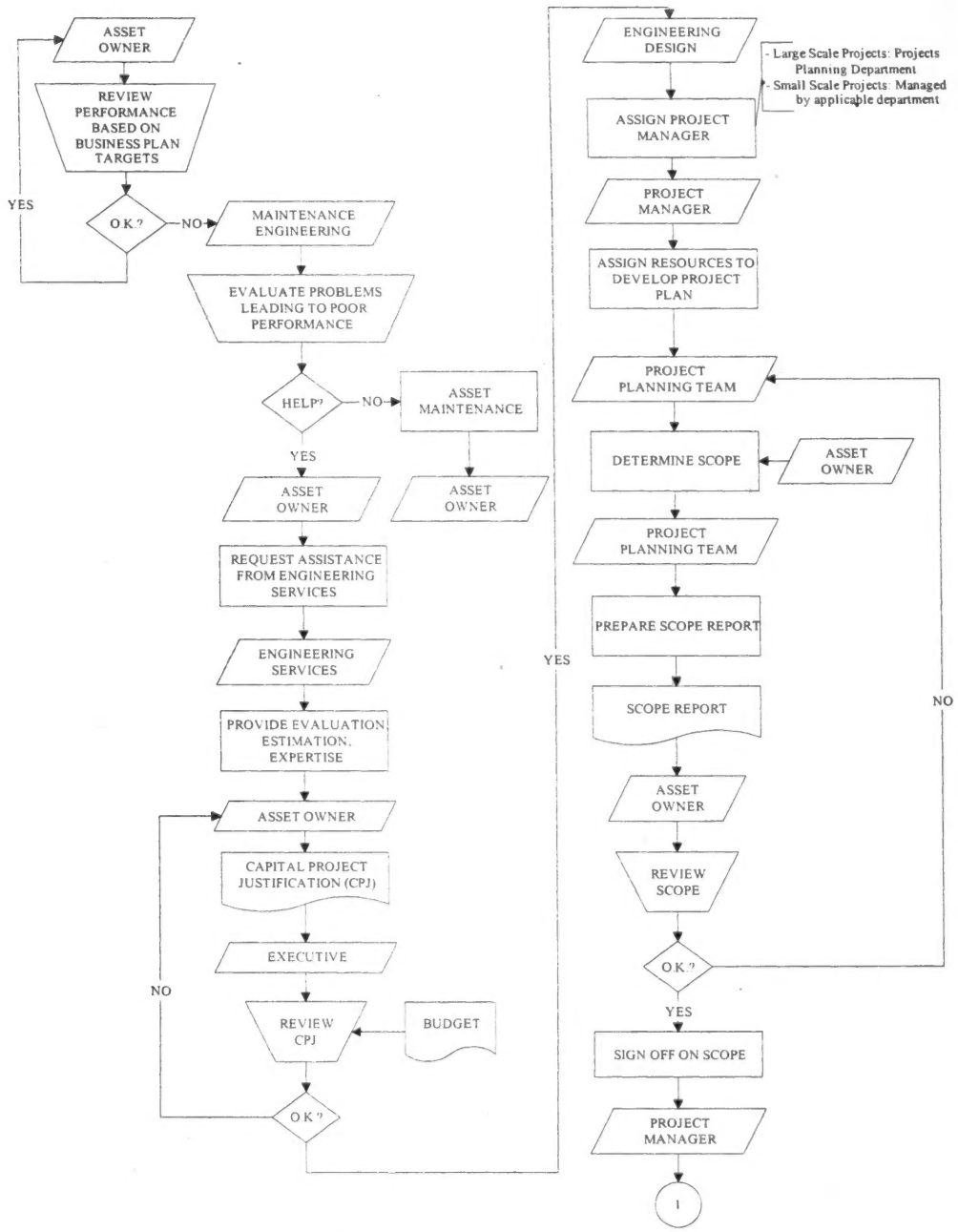

Figure A-4: Design Engineering Process

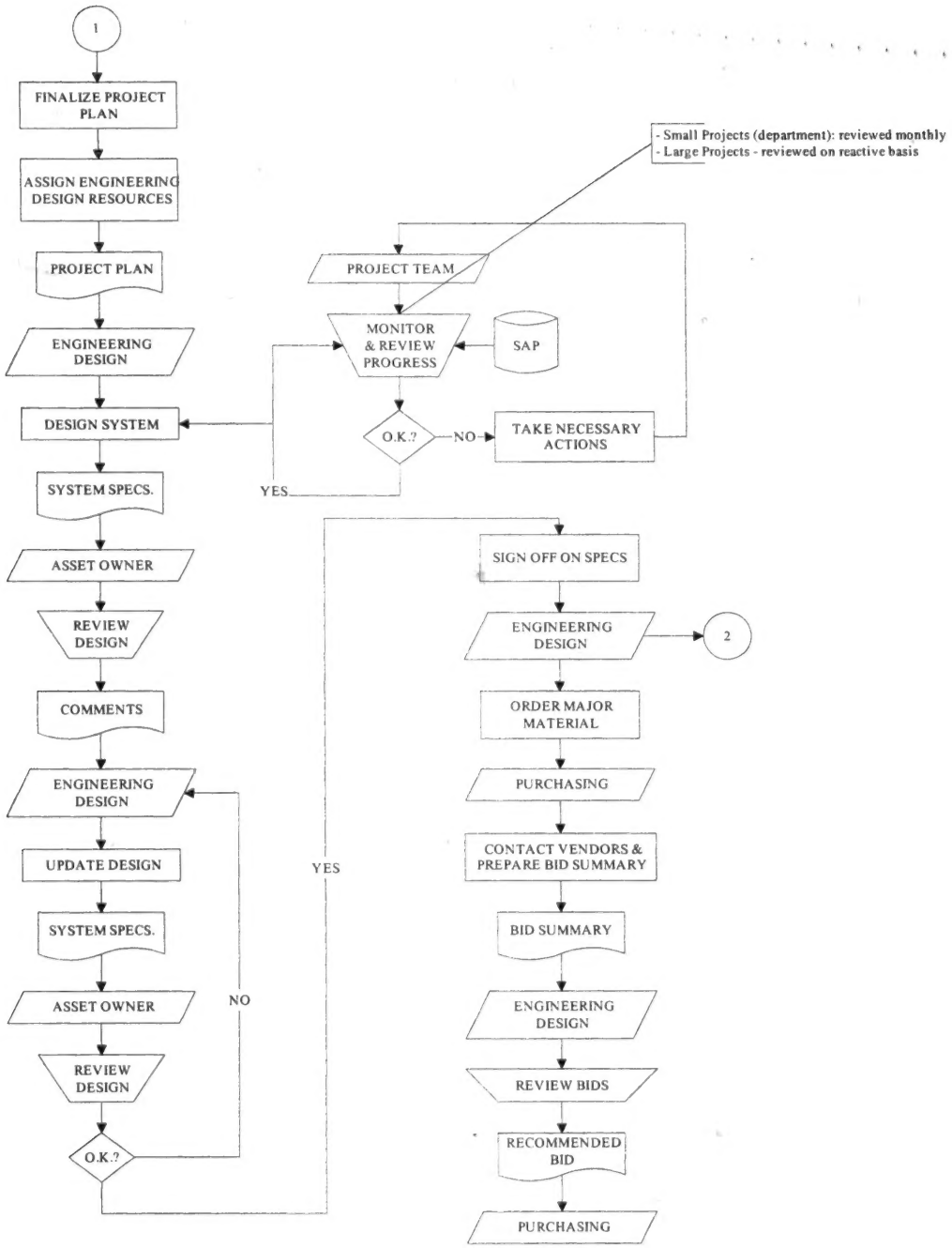

Figure A-4: Design Engineering Process Continued

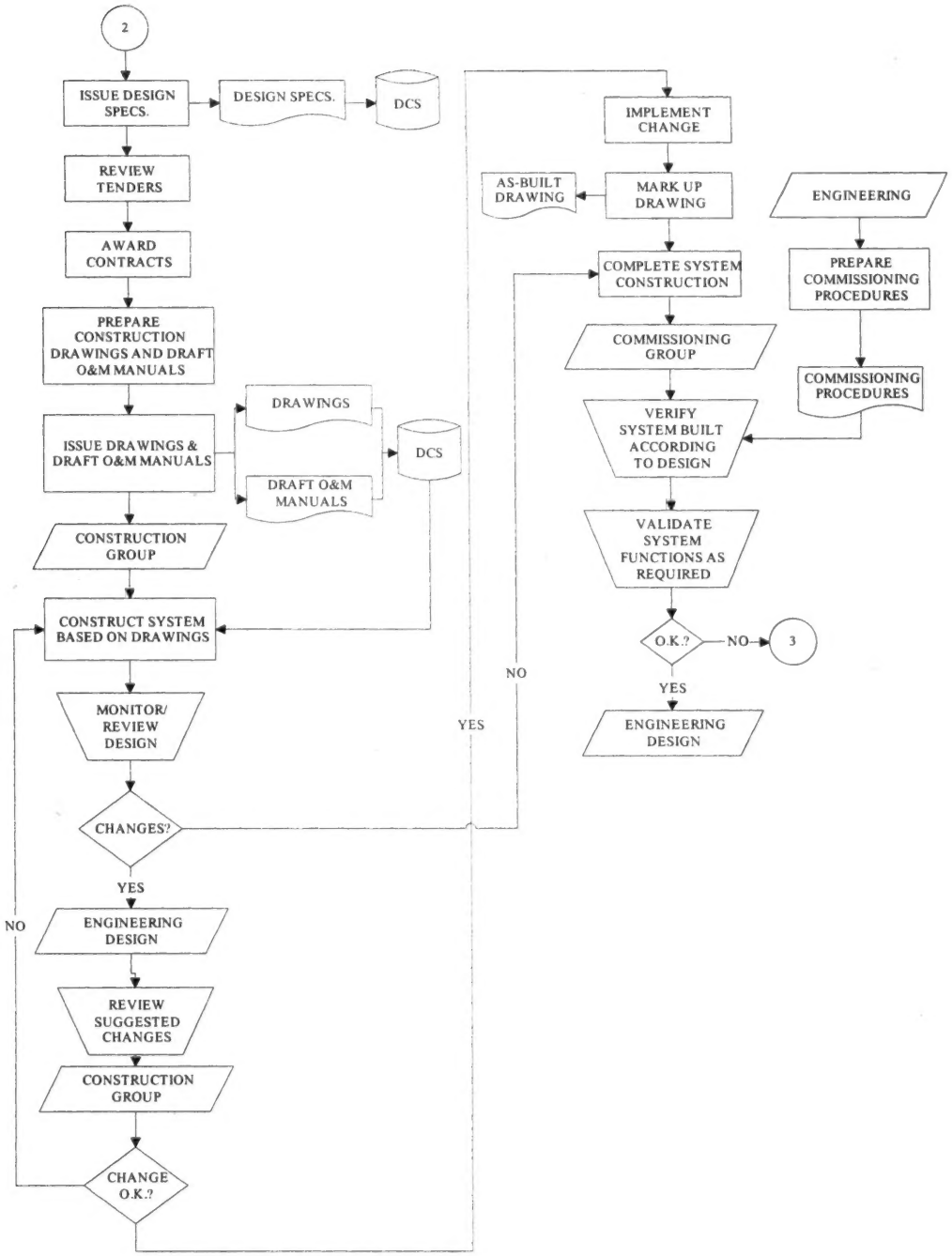

Figure A-4: Design Engineering Process Continued

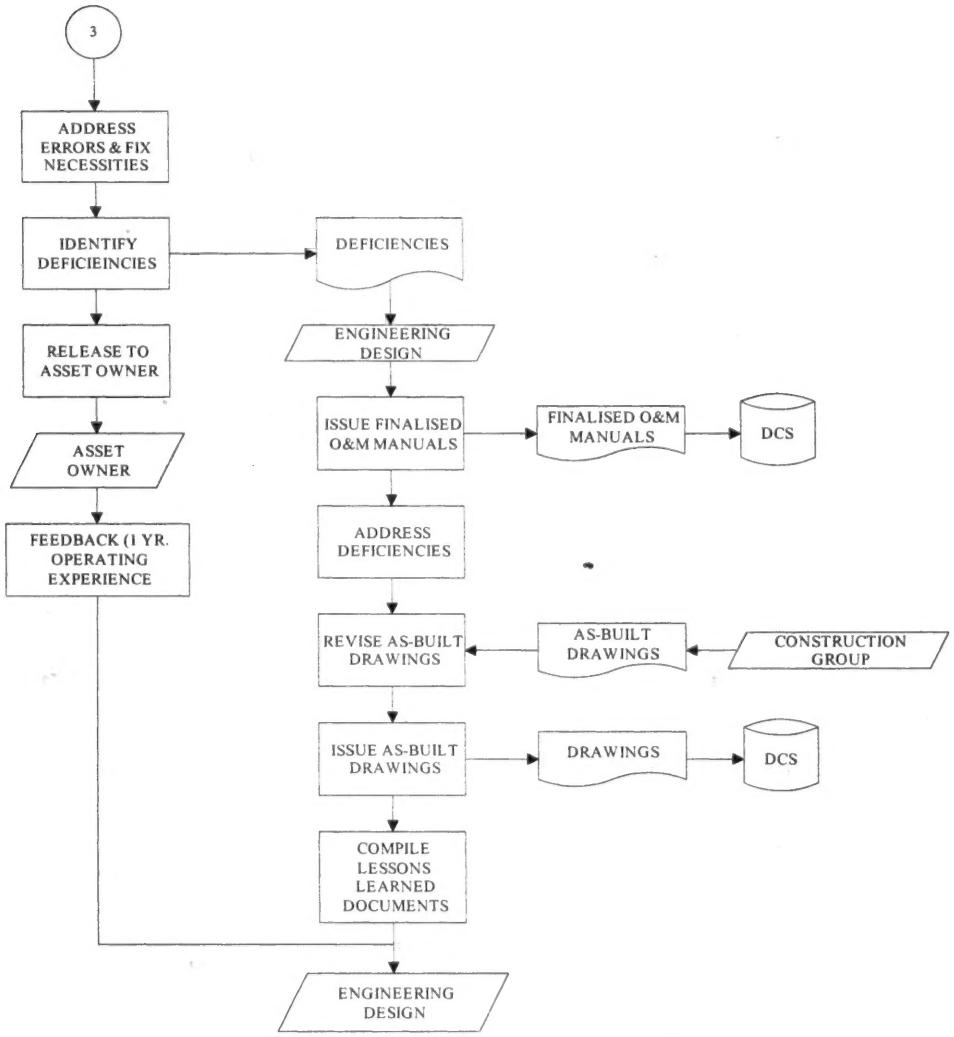

Figure A-4: Design Engineering Process Continued

Table A-5: Customer Service Operations & Contact Centre Results

What are some strategic actions to address customer satisfaction? What information was used to determine that these areas needed attention?
Goal: Deliver exceptional value through public safety, customer service, and high reliability. *Measures:* - # of customer complaints applicable to operations - customer transaction survey - average customer outage time - average customer outage frequency - # of public contacts - # of injuries from public contacts - # of customer compliments - Business reviews performed quarterly. - Numerous process improvement initiatives underway in division, developed from business plan goals. - Based on outage time and frequency measures, develop acceptable maintenance and response time programs. - Currently integrating electric and gas operations. Some things done differently (i.e. gas operations did not track outages)
What methods are used to confirm statutory/ regulatory requirements are met?
- Responsible for the inspection of all new buildings, infrastructure to ensure they comply with statutory and regulatory requirements. - Provide training in this area.
What is the overall structure and function of the Customer Contact Centre?

- 3 main contact centres 70 District Offices.
- The Contact Centre handles calls regarding
  - new accounts/moving
  - complaints/compliments
  - gas inspections
  - "Call Before You Dig"
  - Gas leaks/gas blowing
  - Outages

What system is used to track customer information? What are the linkages to other systems/groups?
- Three different systems currently in use. Project underway to integrate all into one system. These systems track all customer information and contacts - Complaints/compliments tracked through a Lotus Notes system, which is linked to e-mail to pass along information to appropriate people. - System linked to telephone – used to track calling statistics - Trouble Call Response System (TCRS)

Table A-5: Customer Service Operations & Contact Centre Results

How are customer accounts set up and customers billed?
Customer Accounts: customers call contact centre to arrange a new account or move. Information collected includes: - Name of resident(s) - Employment - Phone #'s (work, home) - Rental – land lord - New Sale – lawyer name - Meter reading or estimate No inspection is done – account just activated Customer Billing: - Utility Services a. Read meter (s) (gas/electric at the same time) b. Enter reading(s) into hand-held device c. End of day, download readings into billing systems – separate systems for electric and gas d. For most customers, read bi-monthly (estimate one month, read the next) - Customer receives separate gas and electric bills, in same envelope - Payment options: in-person, mail, automatic withdrawl (equal or pre-payment)
How are complaints and compliments dealt with and tracked?
Complaints: - Tracked in Lotus Notes system, attached to e-mail. Each entry is uniquely identified. - Person responsible receives e-mail with complaint information. - Complaint is addressed and comment is entered in system. The complaint is then considered closed. - Someone is appointed to oversee complaints and ensure they are dealt with in a timely manner – will act if necessary. - No target of how long a complaint can be open is set, but most complaints will be addressed within one to two days. Compliments: can be received from three areas - Customer compliments employee from another part of the organisation - Customer compliments person they are dealing with in Contact Centre - Someone else within the organisation compliments another employee Reporting: - Complaint/Compliment report done every six months and distributed to Contact Centre staff - Yearly report compiled and given to Corporate Planning & Development

Table A-5: Customer Service Operations & Contact Centre Results Continued

How are outages addressed?
- Contact Centre receives call from customer regarding outage - Contact Centre enters information into TCRS and then waits form more calls to see if a trend develops - Once trend is identified, a service crew is dispatched to address the problem - Contact Centre notified of problem and estimated time to repair - If necessary, phone message recorded - Once problem is fixed, Contact Centre notified again – message removed, customers contacted if necessary
What other initiatives have been undertaken to ensure quality of service?
Manual call monitoring has been implemented to assist in: - Ensuring quality of customer service, provide coaching/feedback, recognising training/development needs, and offering reward/recognition to staff. - Implemented as an interim solution – awaiting approval to purchase automated voice and data monitoring system. - Supervisor tries to tap into three calls/person/month. Follows developed guidelines and evaluation form. Team of 2 supervisors and 4 employees work on feedback from employee survey. Rewards/Recognition Program (Quarterly Gold Star Award): - Developed from Employee Survey feedback. - $50 from corporate collection, flowers/balloons, letter, gold star, etc. - Names submitted by peers or identified through compliment tracking. - Submitted names reviewed – look at other things like call statistics, etc. - Not sure if it is a good idea or not – rewards individual vs. team achievements Customer Satisfaction Survey: - Received funding to perform customer satisfaction survey – no further funding established to make this an instituted process. - Outside company administered survey. - Provided 2500 customer names who had had direct contact with Contact Centre – had 500 respondents (by region and service) - Four point scale (very satisfied, satisfied, dissatisfied, very dissatisfied) - Results compared against average and best call centre (all industries). Some categories compared results with other electrical utility call centres. Call Statistics: - Have program attached to phone system to calculate statistics. - Prepare monthly Activity Report and compare against targets set in business plan. - Assist in staffing plan, business plan, and performance improvement initiatives. - Hard to forecast staffing levels – ongoing integration of two electric utilities and one gas utility is causing some unpredictability.

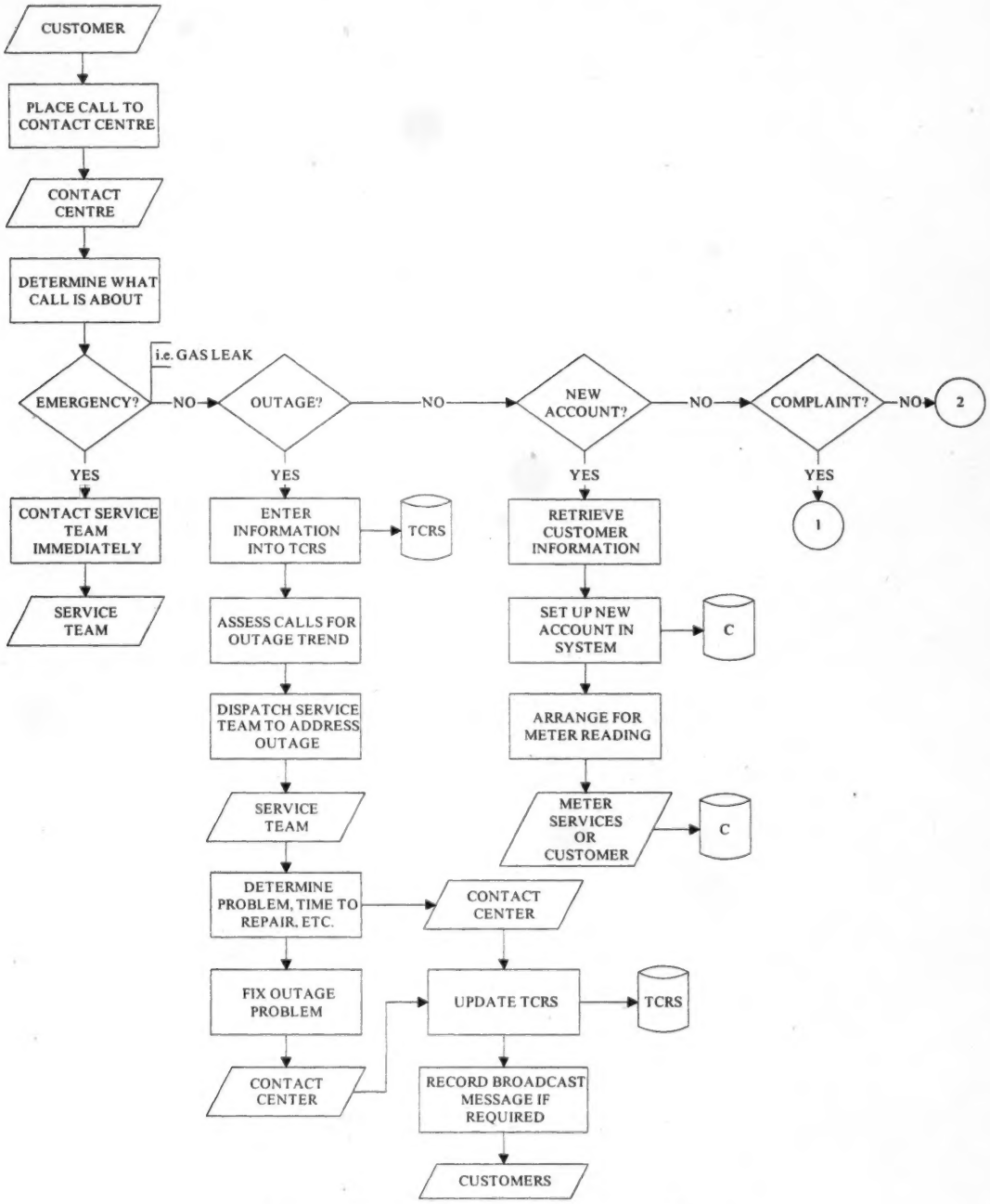

Figure A-5: Customer Contact Centre Process

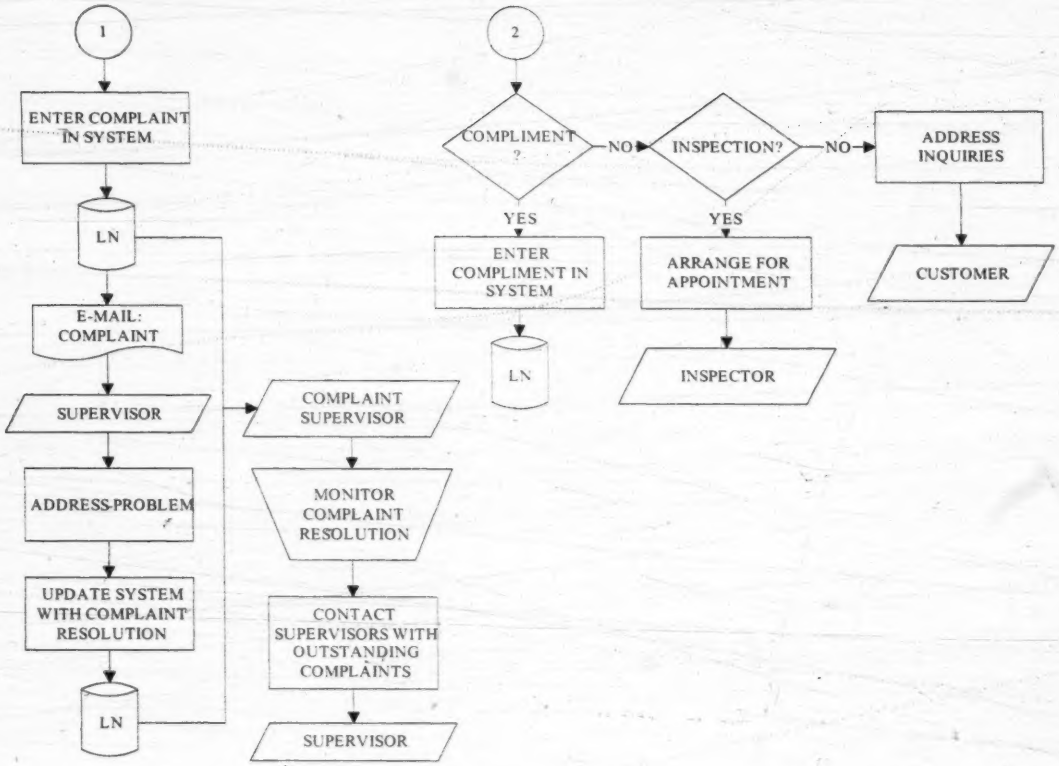

Figure A-5: Customer Contact Centre Process Continued

Table A-6: Quality Improvement Initiative Results

How are opportunities for quality improvement initiatives (QII) defined?
- QII's are developed from an area's business plan. Managers/leaders of the area determine what projects will contribute to the success of their area in meeting goals. - Tend to focus on short term gains than long term goals
How are responsibilities assigned for QII?
- Initiation of project, Project Charter is developed a. Objectives b. Resources, leader c. Sponsor (high management) d. Cost/benefit analysis e. Milestones (reviews) - Projects tend to take between 4-9 months - Managers are not actioned to initiate projects and the acceptance/success is different through the organisation - One major, obvious problem following implementation is that the maintenance of processes to ensure that benefits are lasting is not stressed.
What training/awareness has been done in the area of quality improvement?
- Initiated quality movement around 1995. Original goal was to have quality improvement integrated in organisation in 3 years – did not happen - Trained Performance Improvement Advisors (PIA's). These individuals were then equipped to spread this knowledge throughout organisation. 100 PIA's trained. - Training is fine – people develop the knowledge and expertise. However, in some areas leaders offer very little support and not much has been done. Support is not uniform throughout organisation, although seeing improvement over time
Has ISO 9001:2000 been investigated for any areas of the organisation?
The Meter Shop conforms to most ISO 9001 guidelines. The regulation it needs to adhere to is very close to ISO (procedures, audits, CARS, Equipment Maintenance)

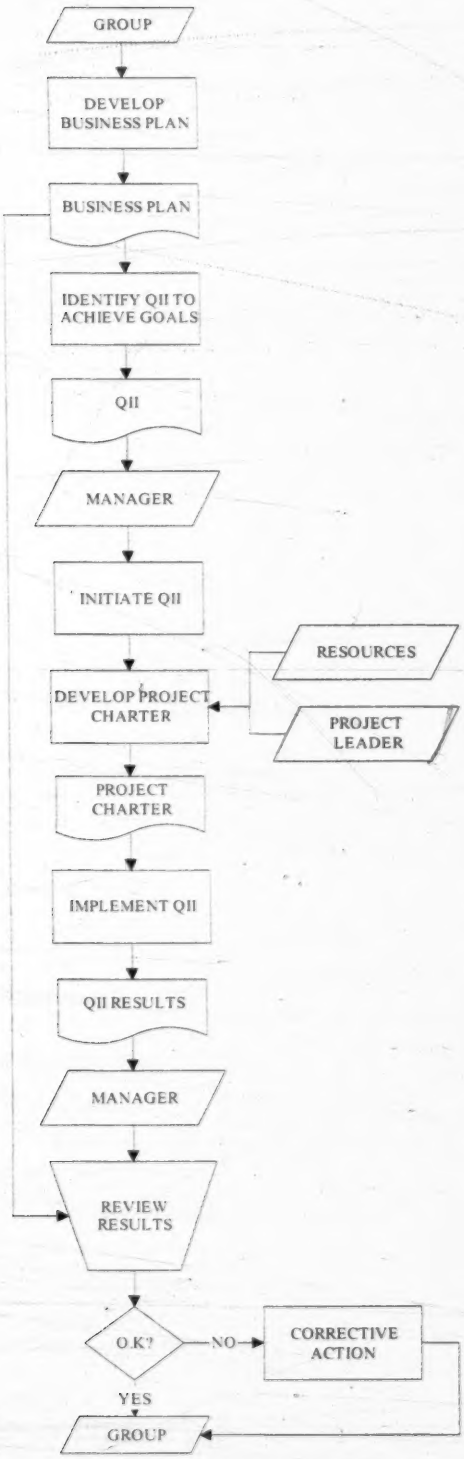

Figure A-6: Quality Improvement Initiative Process

Table A-7: Public Affairs Results

What is the overall structure and function of this department?

- Public Affairs is made up of three groups:
  - Corporate Communications
  - Pre-Press & Digital Imaging
  - Policy & Directives
- Resides in Corporate Business Unit – responsible for corporate image
- Prepares and administrates communication for two audiences: internal & external

What is the process for internal communication?

- Three channels for communication:
  - Weekly newsletter (print)
  - On-line daily newsletter (intranet)
  - Corporate broadcast (e-mail)
- Employees pass message to Public Affairs. Public Affairs reviews and revises if necessary (usually for clarity). The appropriate channel will be chosen and the message will be communicated.
- Responsible for the compiling and distributing corporate documents such as the Corporate Strategic Plan and the Annual Report (administrative-type role). Liaison with Corporate Planning and Development, graphic artists, printing, etc.

What is the process for external communication?
- Produce monthly pamphlet about energy conservation that accompanies customer bills - Television ads, especially for promotion regarding power saving initiatives - Billboards - Media contact for outages, emergencies, etc. - News releases (e.g. infrastructure announcements) - Internet Informal process generally
How does this department deal with customer feedback?
- Receive feedback through letters, phone calls, or e-mails (corporate website) - For corporate website e-mails, IT filters and posts them to the appropriate area. Employees check inbox daily to address any concerns that may have been placed by employees. - Feedback (complaints) recorded in a formal document and saved into a corporate registry. If complaint is more applicable to another area, it will be forwarded.

Table A-7 Public Affairs Results Continued

How is customer feedback and requirements passed to top management for corporate strategic planning?
Approach is informal. Certain pockets of the organisation will be aware of concerns or new requirements through their own research or feedback. This information gets informally filtered upwards and will often become incorporated into the corporation's strategic plan.
What is the process for establishing and maintaining corporate policies?
Corporate policies are controlled by this department. Employees interested in submitting a policy draft it and get approval from their area manager. The policy is then submitted to Public Affairs, where it is assigned a unique identifier and maintained (revision, etc.) **Corporate Policy Statements:** reflect CSU's position or way of thinking regarding its activities (based on corporate goals, mission, key processes) **Principles:** general statement for a topic that has related guidelines or practices **Guidelines:** details how to carry out what been stated in corporate policy statement **Practices:** step-by-step actions on how to do a task.
What formal control does this department have over corporate communications?
This department administers the information posted on the intranet and internet. The process is not entirely formalised and information not filtered through Public Affairs does sometimes get posted. This area also works closely with IT to ensure integrity of information and preservation of the corporate image.

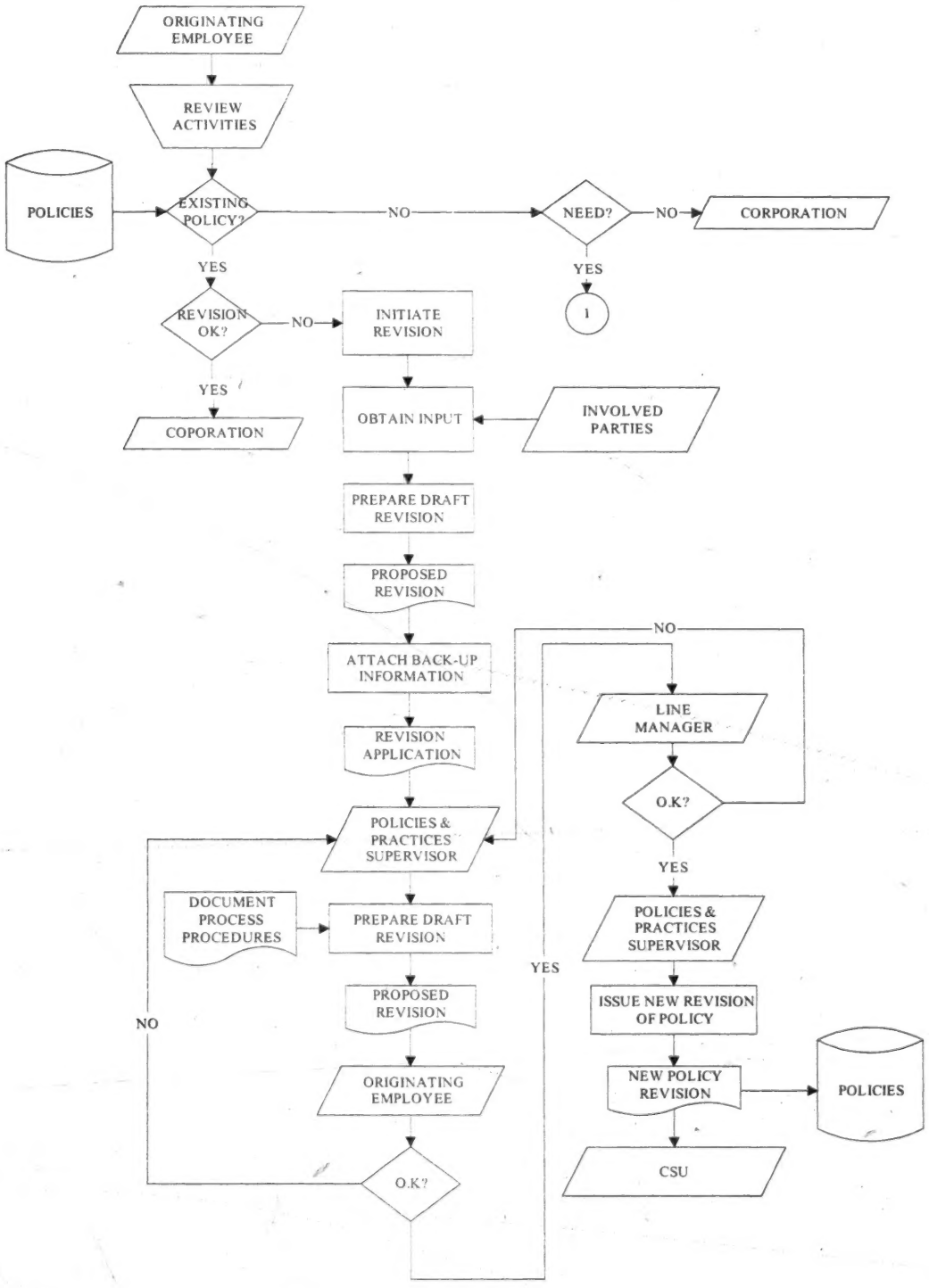

Figure A-7: Corporate Policy Process

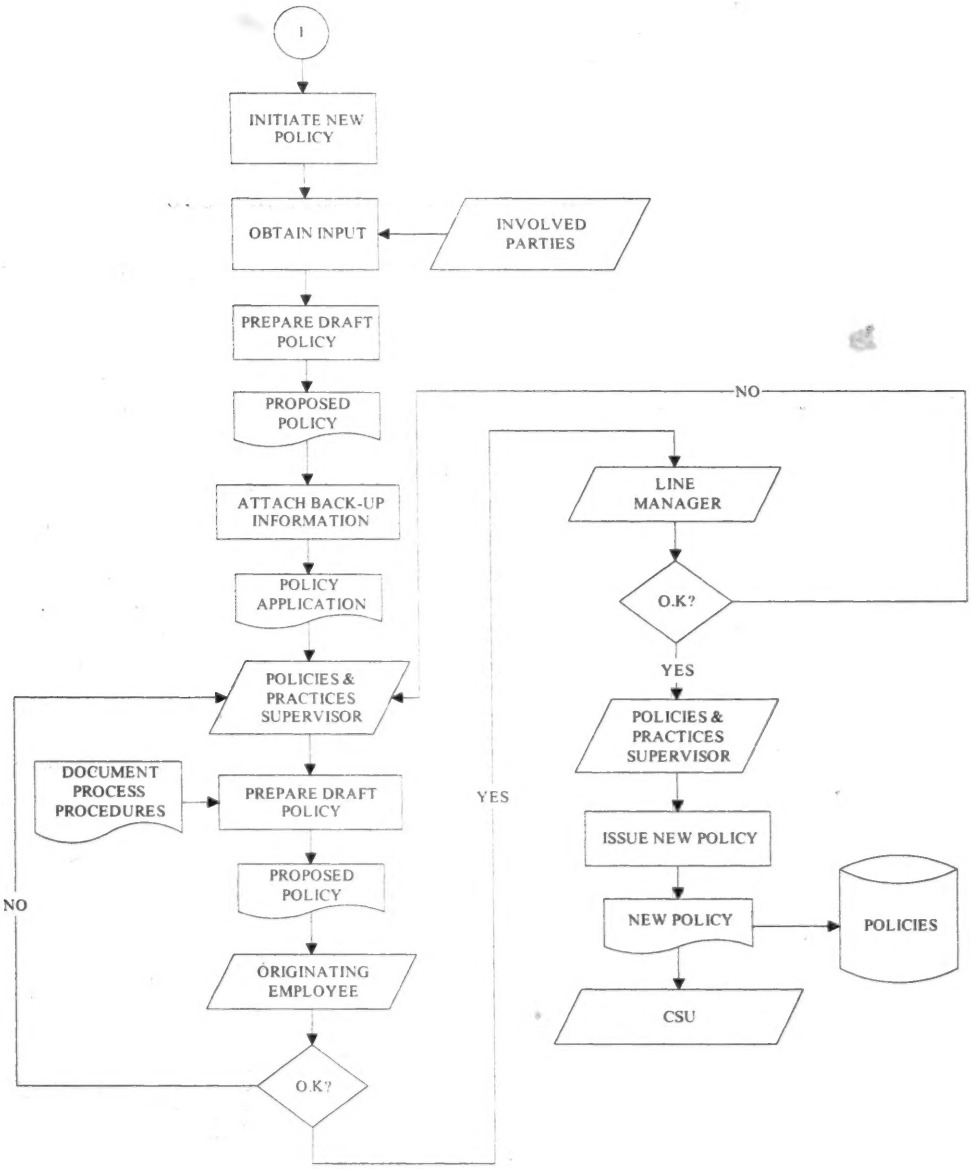

Figure A-7: Corporate Policy Process Continued

Table A-8: Human Resources Results

What is the overall process for determining the need for personnel resources?
- Individual areas do an annual forecast of required personnel (with justification). This forecast filters up through management, with the final decision made by the President. - Decisions tied closely with budget provided by Corporate Accounting
What are the channels through which employees are hired?
- Hiring is done through both internal and external means. - External hiring programs include engineering, commerce, IT and field workers.
What is the overall internal hiring process?
- With hiring approval granted, supervisors review the job description and competencies for accuracy - Jobs are posted internally (both paper and on-line) for the required posting period - When job closes, applicant information is entered into a database and an applicant package is prepared for the hiring supervisor. - Supervisors look at all applicants and their eligibility (union requirements, seniority, etc.) and develop a short list. - Interviews are conducted- competency based using a prescribed matrix. The interview panel will consist of a minimum of two people and applicants are scored individually and as a group. 1-5 scale used, with 3 being the competency threshold. - Offers are made and applicants not accepted are also notified. Denied applicants are free to file a grievance.
Where are job descriptions, competencies stored?
There is a shared drive listing all job descriptions and associated competencies. Only areas applicable to the job descriptions have "write" access – however "read" access is widespread.
What orientation is provided to new employees?
New employees are presented with a book which details corporate information. It is used as a guide to orient new employees.

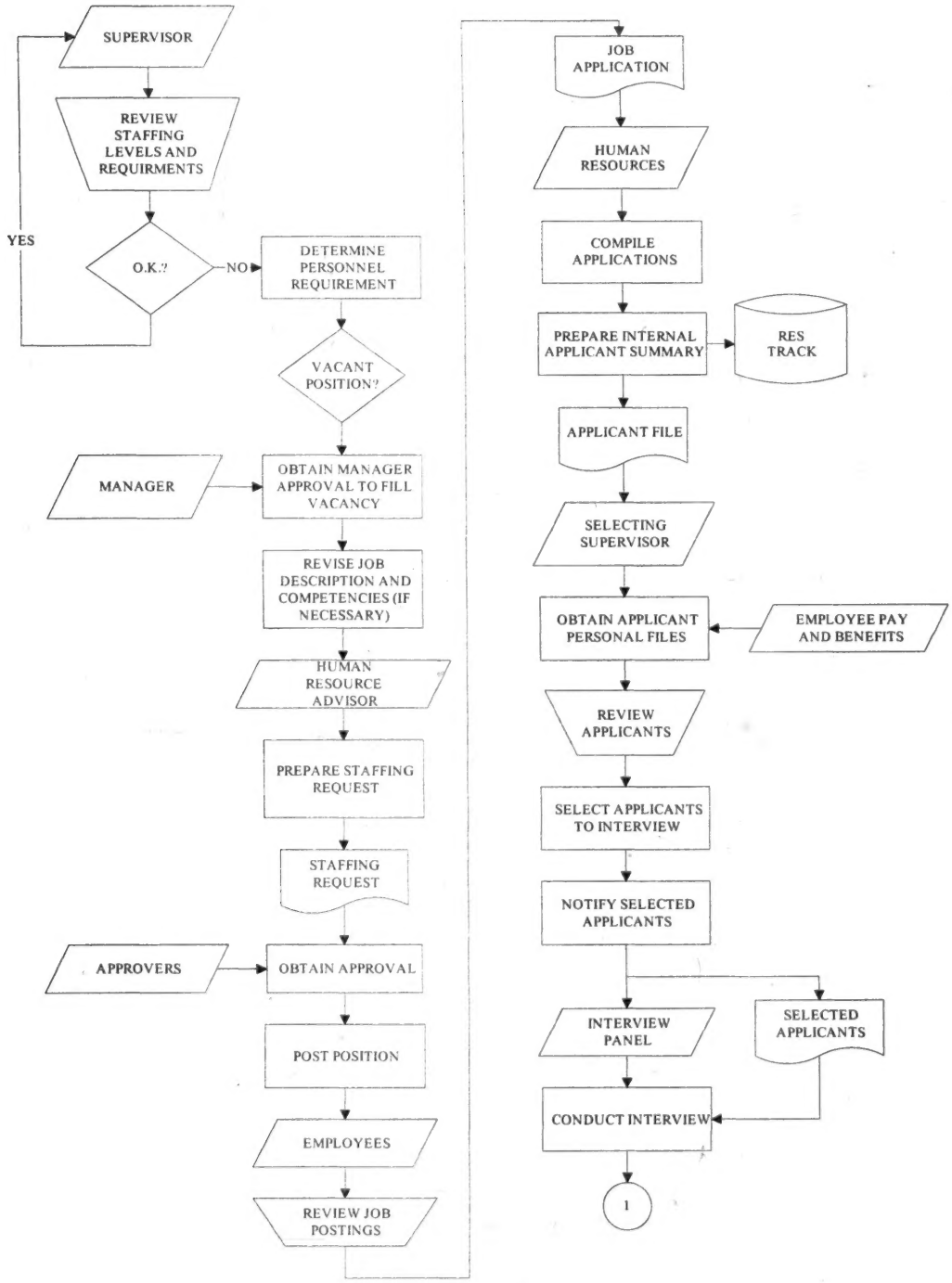

Figure A-8: Internal Hiring Process

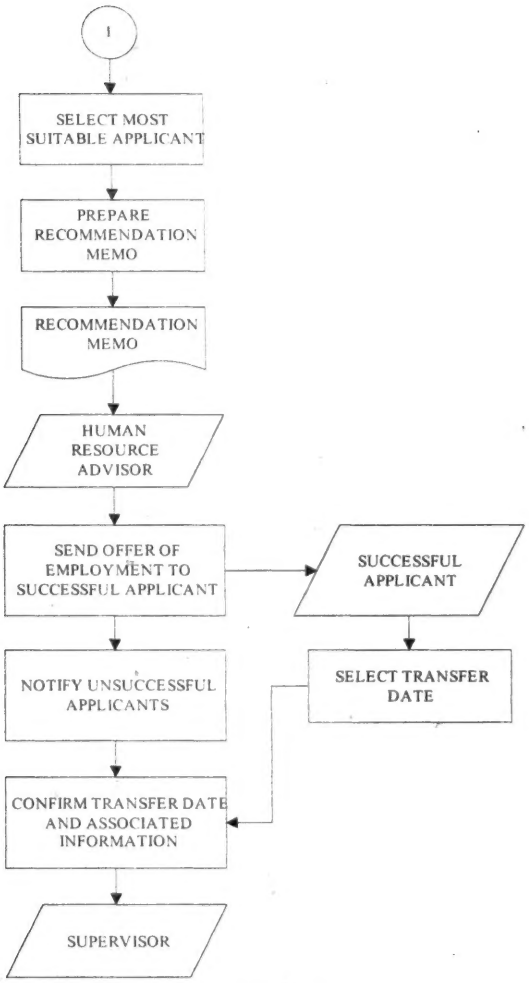

Figure A-8: Internal Hiring Process Continued

Table A-9: Engineer-in-Training Program Results

What is the overall structure of the E.I.T. program?
- In existence for twenty years, with recruiting done through universities - E.I.T.'s participate in 2-year training program, with 4 six-month rotations. - Following (or prior) to end of program, E.I.T.'s work into a permanent position - Offers new engineers exposure to different areas of the company - Other professional training programs: Commerce and Information Technology - Training programs are primarily where new employees enter company, since the CSU has a priority to first try to fill positions from within and then look externally if the position cannot be filled. External hiring needs senior management approval. - Engineering positions within the company are typically staffed from the E.I.T. pool.
How are E.I.T. requirements established?

- An annual forecast is performed consisting of two components:
  - Corporate HR prepares internal forecast - based on factors such as retirement, historical losses (voluntary/non-voluntary)
  - Areas will look at new projects and determine if new positions are required
- E.I.T. levels historically remain level, with a comparable budget between years.
- Forecast is reviewed by the E.I.T. committee – senior management has final approval

What is the training and development program for E.I.T.'s?
- Professional development fund which is to be used to enhance professional status - Other training funds for safety, internal processes, etc. - E.I.T.'s able (with appropriate approval) to attend conferences, etc. Sometimes, supervisors may request attendance and approval is administrated through that area. Others times, the request comes from the E.I.T. and approval is done through HR. - All training is tracked through OnTrack database - Proposing to develop a suggested core list of recommended courses for E.I.T. - Some supervisors/E.I.T.'s develop personal development plans - not a program requirement
What is the overall hiring process for E.I.T.'s?
- Following forecast, the E.I.T. committee and sub-committee meet and review the recruitment process. - Post E.I.T. positions at universities (September) - Screening and initial interviews performed by sub-committee - 2nd level interviews performed by committee and final selection made - Committees meet to review selection and final offers are made - After hiring, committees meet to review recruitment process - Attend university career fairs to promote company - Receive resumes from other universities besides where positions are posted - Sub-committee meets May and November and assigns rotations. E.I.T.'s may request rotations and open E.I.T. positions are posted on an internal website.
What is the mentoring process for E.I.T.'s?
- A pool of mentors has been assembled (somewhat hand-picked). - Each E.I.T. is assigned a mentor and this relationship lasts for the two-year period. - Mentors provide guidance and assistance where necessary.

Table A-9: Engineer-in-Training Program Results Continued

What is the E.I.T. review process?
- Half-way through rotation, the E.I.T. and mentor meet to review progress. The mentor can also get input from the E.I.T.'s supervisor - End of rotation, formal performance appraisal is done by supervisor - Professional Association requires a report by E.I.T. and supervisor for each rotation - HR also receives a report from E.I.T. (typically 2 pages) giving an overview of their experience, good/bad points, and opportunities for improvements.
What is the E.I.T. program review process?
- The E.I.T. program has a senior management sponsor (VP) who is the bridge between the program and the President. - Formal reviews are not scheduled but the sponsor is contacted if any issues arise - Semi-annual function for all professional programs. Information sessions, speakers, sponsors and president invited - E.I.T. specific function. Sponsor, committee members attend. Usually have a Q&A session and an engineering-focused speaker
What involvement does the CSU have with this region's Professional Association?
- The CSU requires all engineers to obtain professional designation and this achievement is tied in with salary - The CSU has an internal professional engineer association that acts as a voice for engineers within the corporation. There is a representative from this association on the E.I.T. committee

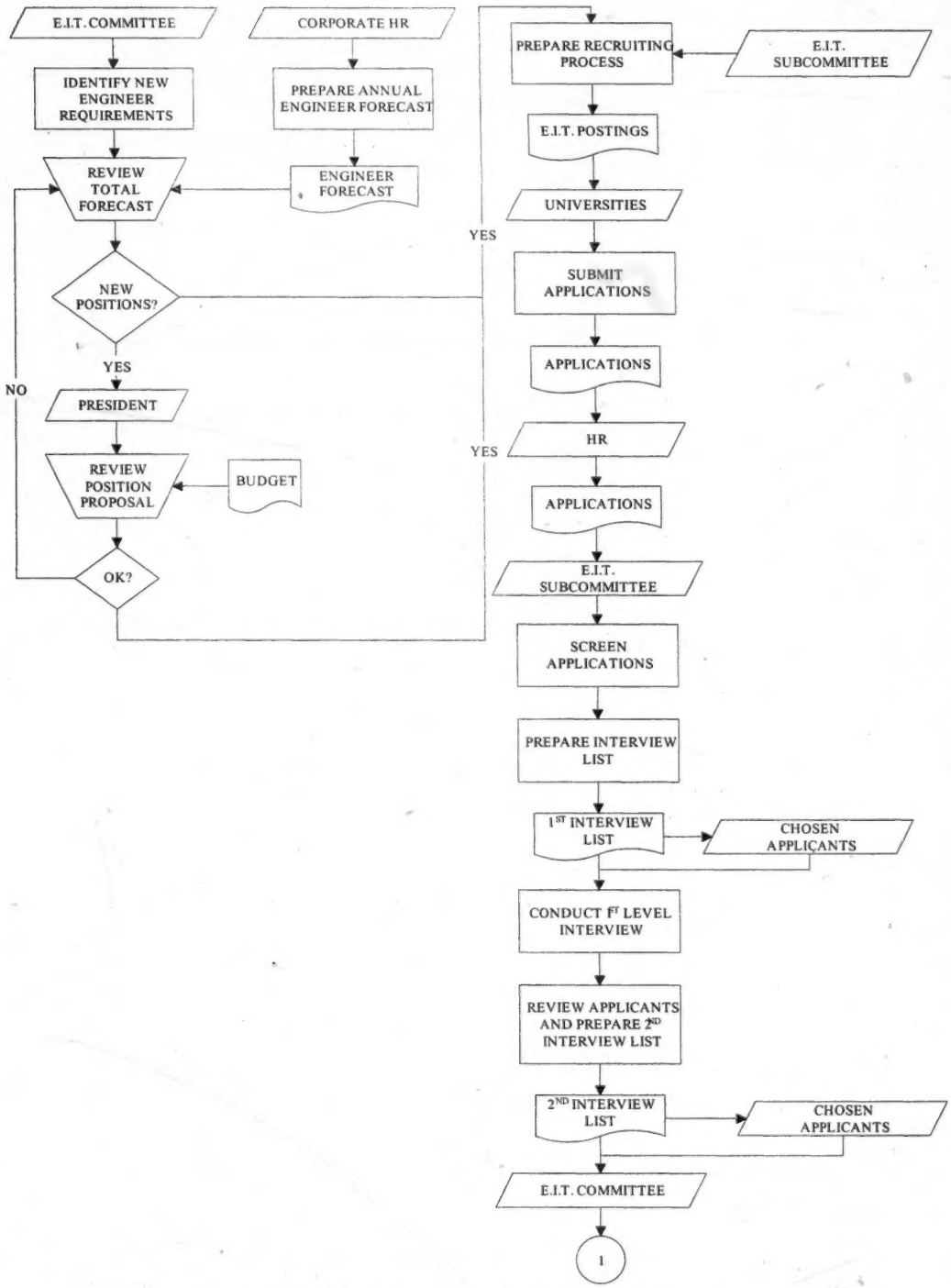

Figure A-9: Engineer-in-Training Program Process

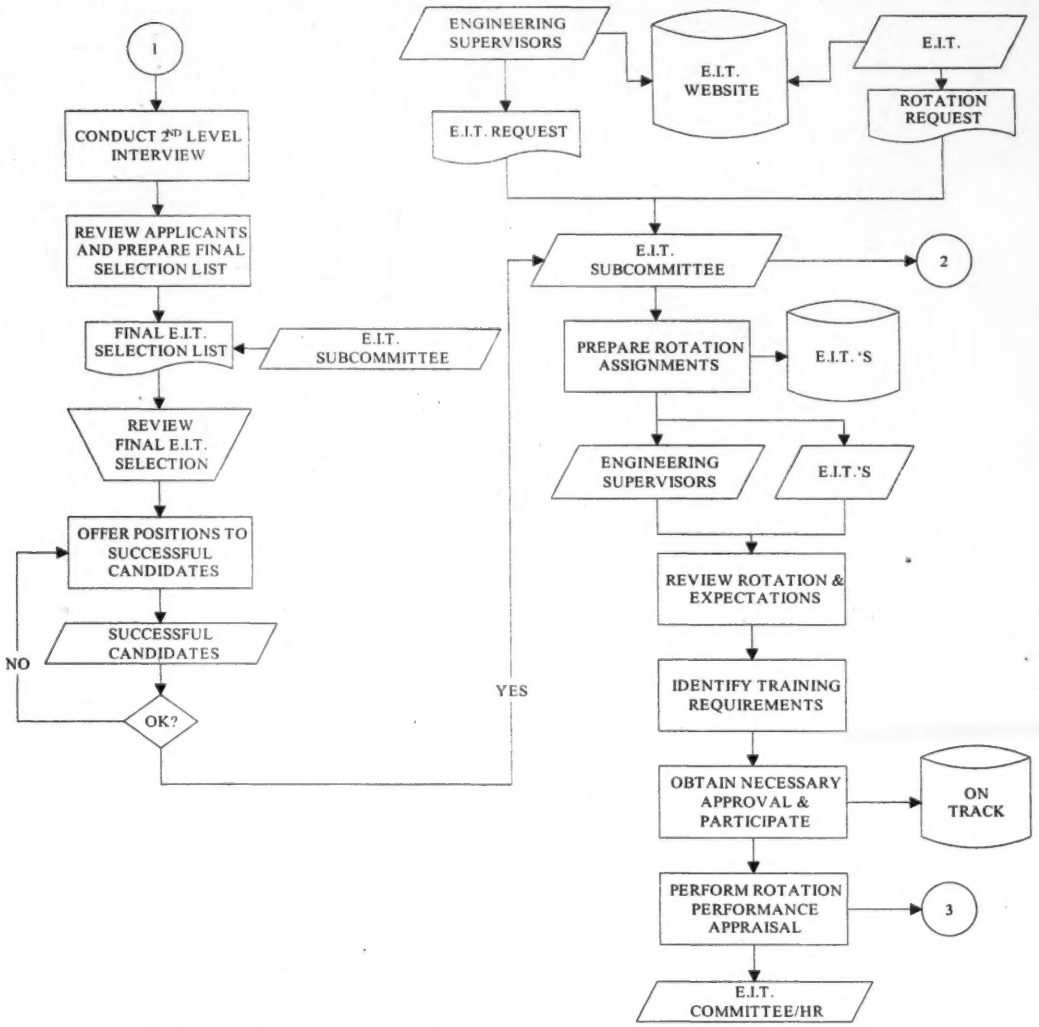

Figure A-9: Engineer-in-Training Program Process Continued

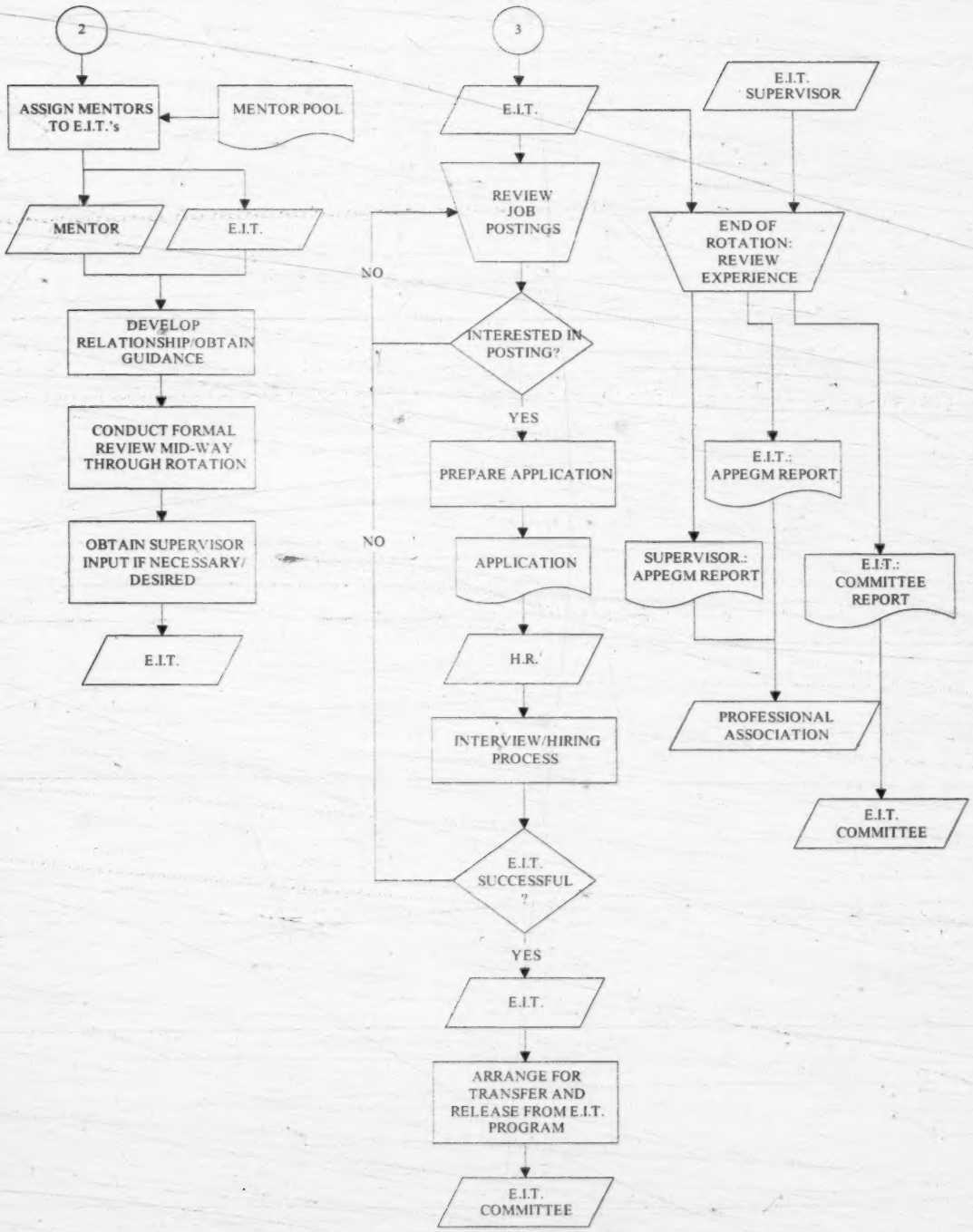

Figure A-9: Engineer-in-Training Program Process Continued

Table A-10: Meter Shop Results

What is the overall function of this department?
- The Meter Shop is responsible for the servicing of all meters (both electric and gas) for the entire CSU jurisdiction. - Servicing involves inspection, washing, repairing, calibration, final test and sealing.
What guidelines does this department adhere to?
- The Meter Shop is accredited through Measurement Canada, a branch of the federal government. Accreditation program based on ISO 9000 requirements and other applicable items. These guidelines allow accredited organisations to entirely service all meters. Prior to accreditation, meters had to be final tested and sealed by Measurement Canada. - Accreditation is renewed annually through Measurement Canada audits - Currently reviewing registering to ISO 9001:2000. Believe it would assist in increasing customer focus and converting the QMS to a more process oriented approach. Also, Measurement Canada recognises ISO 9001:2000 audits to a certain degree.
What type of documentation control system is in place?
- Documentation Control System in compliance with Measurement Canada guidelines. - Overall quality manual and policy, work instructions and procedures for all process steps. - Records for all process steps, corrective actions, training, etc.
How are meters tracked throughout the servicing process?

- Gas: tracked through the Banner system (came from acquired gas utility operations)
  - Upon receiving, gas meters are bar-coded and can be tracked electronically throughout the servicing process
  - Meters are scanned at every station
 	
- Electric: tracked through the CSCS system (electric utility operations)
  - Meters are manually tracked throughout the servicing process. Areas for each process step are clearly defined on the production floor
  - Plans for automated tracking are in place and will be implemented once the electric side of the business converts to the Banner system (2006)

What is the operator training program?
- Job positions are classified, with each classification assigned a list of responsibilities and technical tasks. - A training program exists and records for each employee are kept. Once a certain task/responsibility has been mastered, both the trainer and employee sign off and this information is recorded.
What is the equipment maintenance and calibration process?
- Each piece of equipment has its own maintenance schedule, which is documented and tracked. - Equipment that does not conform is quarantined and necessary action is taken.

Table A-10: Meter Shop Results Continued

What process exists for corrective and preventive actions?
- A Corrective Action Request (CAR) program exists and is administered by the quality assurance supervisors – gas and electric. - Employees are empowered to note issues that are causing or have the potential to cause problems. Fill out CAR forms and present them to QA supervisors. - QA supervisors are responsible for working with employees and other affected personnel to develop corrective actions and also if applicable, preventive actions to address the problem. - The actions taken, dates, and employees involved are tracked and records for all CAR's are maintained.
What focus is continuous improvement given in this department?
- Aside from the CAR program, supervisors and management are supportive of the quality program and promote awareness throughout the department. A component of weekly staff meetings is the incorporation of suggestions for improvement. - All suggestions put forward are followed up on and the department also provides a suggestion box where employees can submit comments anonymously. - Behaviour Based Safety System provides opportunities for continuous improvement. Employees are required to conduct a safety inspection of a fellow employee once every two weeks. The inspection is performed against a prescribed list of criteria, with all observations noted, recorded, and followed up on. Some of these observations relate to quality and opportunities for improvement. - An annual internal customer satisfaction survey is performed to assist in learning customer perceptions and identifying opportunities for improvement. The three key areas identified by customers involve: - ensuring meters are available - availability of meter shop staff when contact is necessary - availability and competency of meter staff to address questions/problems
What is the overall reporting process for the program?
- Annual Accreditation Management Review (Division Manager and Vice President). Review involves departmental objective evidence that the program is in compliance and continuously improving. Information provided includes classification and quantification of CARS and trend analysis. - Internal customer complaints also a part of the annual review. This registry is separate from the corporate complaints system, although this department will typically receive 1 or 2 complaints annually from this system.
What is the auditing process for this area?
- Internal audits are performed monthly and follow the Measurement Canada guidelines. Internal audit reports detail what was audited, the co-operation level, CARS, and conclusions regarding compliance. The internal auditor may issue CARS for non-compliance. - Internal audit reports are presented to the department manager. The internal auditor also participates in the annual accreditation management review. - Measurement Canada performs annual accreditation audit. Loss of accreditation will be economically detrimental, since the CSU will lose its ability to final test and seal meters.

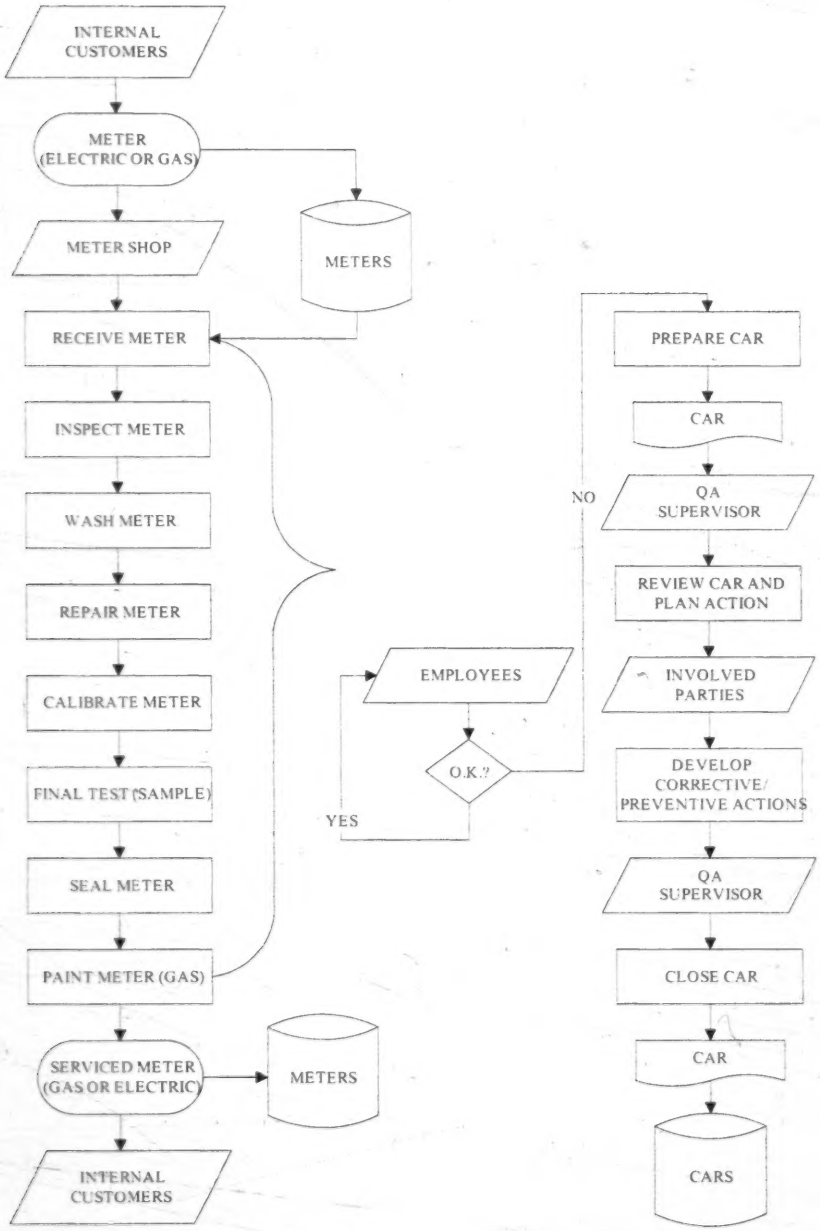

Figure A-10: Meter Shop Process

Table A.-11: Business Communications Results

What is the structure and function of this area of the corporation?
Business Communications falls under the Customer Service and Marketing business unit. - Public Education & Safety (customer interface) - French Language Services - Creative Services (video production, news releases, brochures, speaking notes) - Promotions & Sponsorship (event management, community relations, retailers/Power Smart, regional office liaison – internal communication channel)
What are examples of some initiatives undertaken by this department?
- Initiative to promote the use of electricity saving light bulbs. - communicate with government regarding technical standards - communicate with manufactures to perhaps negotiate a coupon deal - communicate with retailers for in-store promotion - communicate with customers to increase awareness, e.g. ads in newspaper - Initiative to promote the purchase of home carbon monoxide detectors - Reduce false CO calls ($ saver) and prevent deaths - Retailer partnership – rebate offer from purchase of CO detector
How are customer inquiries received?
- Contact point on promotional literature is the Customer Contact Centre, which filters inquiries to appropriate areas. - Business Communications generally acknowledge receipt of inquiry often notify the Customer Contact Centre when the inquiry has been addressed.
How is documentation revision managed and controlled?
- A Marketing liaison acts as document control. - All documentation reviewed and revised annually by Subject Matter Experts. - Changes are mainly related to finance, new technology, and new program participants - Reactive documentation changes are performed where required
What methods are used to find out what customers want?
- Quarterly Customer Satisfaction Tracking Study - Looks at rates, reliability, reputation, and customer interaction - Customer Focus Groups (3rd party market research firm) - Performed frequently and on a geographical basis to obtain feedback - Customised Document (Distributed to customers for specific feedback) - Questions refer to the effectiveness of safety and sponsorship activities. Looks at technology, conservation, and responsibility issues.
What are some examples of measuring program effectiveness?
- Partnership with low electrical light bulb retailers. Obtain before and after promotion sales data and also compare electricity consumption. - Initiate a redemption program for old holiday lights and offer a discount LED light purchases. Track LED light sales and look at changes in electricity consumption.
What other business factors influence this department?
- Corporate Social Responsibility – critical to retain integrity and reputation. Alliances have to be strong and technology has to be strong, but not faulty - Corporation should remain unbiased - Being a monopoly does not allow the CSU rest on its laurels – innovation needed - Need to promote conservation awareness to preserve future of supply.

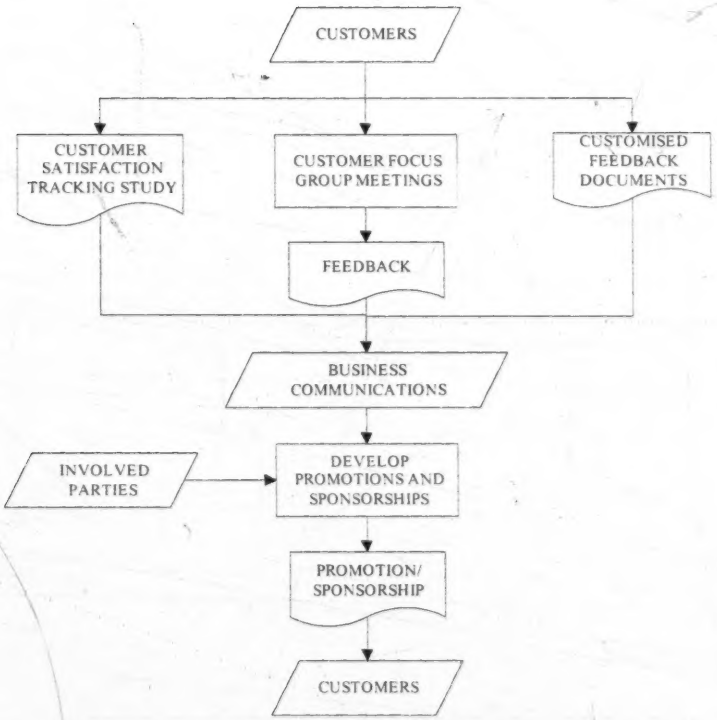

Figure A-11: Business Communications Process

Table A-12: Internal Audit Results

How are audits initiated, planned, and scheduled?
An audit plan is developed based on the ten goals of the corporation. From this plan, hours and auditors are allocated for execution. The main contributors to this plan are - Corporate Strategic Business Plan (CSP) - Corporate Risk Management (CRM) - Budget - Field Observations - Auditor Expertise The Audit Plan is then reviewed and approved and audits are scheduled. (Annual)
What is the reporting structure of this area?
- Administration: Reports to the President/CEO - Function: Reports to the Board Audit Committee – an external resource. - Originally, the Internal Audit department focused to the Internal Audit Review Committee (IARC), but this has changed. The IARC still exists and is involved, but mainly as a conduit for information.
How is objectivity and impartiality ensured?
- The recent change of reporting from an internal source (IARC) to an external source (Board Audit Committee) provides independence at the highest level. - Action plans are done by line management in the audited area and not by the audit team. - Care is taken to ensure that observations are based on facts - Fraternisation during the audit is discouraged - Auditors are all members of professional organisations and are therefore expected to conduct themselves in the highest of professional manners
What is the auditor training process?
Most members of this group have previous auditing experience. Often, they are members of professional associations. All auditors however receive external training where applicable and maintain a personal development plan.
What is the documentation system and process for this department?
A quality manual is maintained. This manual details all the processes other related information for this area. For every audited conducted, a file is compiled. In this file is an index and all preliminary work performed. Also in this file is the assignment planning memo, audit program (objective, criteria), conclusion, recommendations and a draft of the audit plan.
What is the process for verifying that audit follow-up actions have been completed?
Audited departments are generally given six months to implement follow-up actions. However, the work auditors do throughout the organisation inherently keeps them in touch with activities, challenges, obstacles, etc. Therefore, the six month target is flexible, depending on the situation. If the auditing department finds that a department is not implementing action items, this issue will be taken to the next level (IARC).

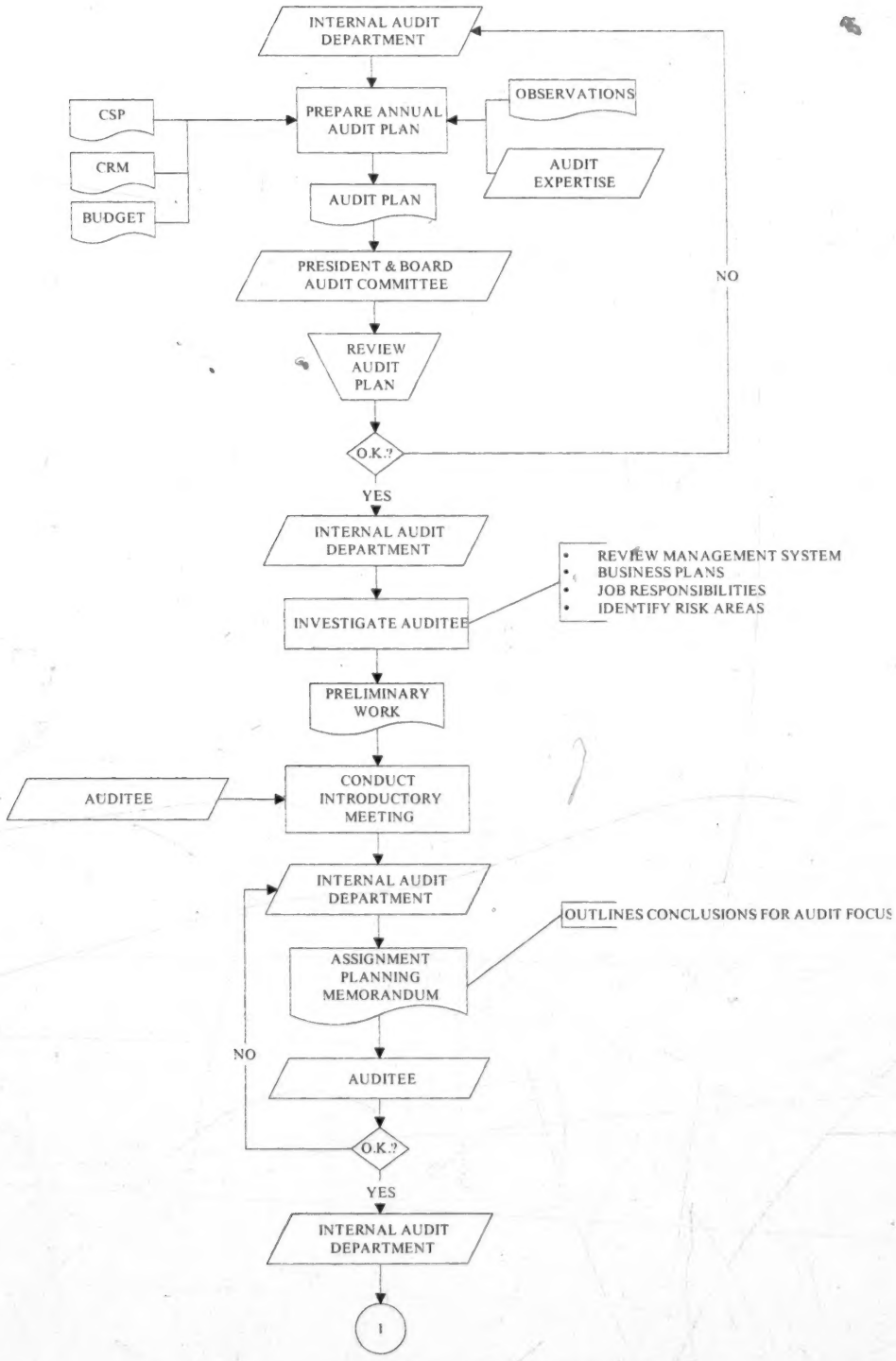

Figure A-12: Internal Audit Process

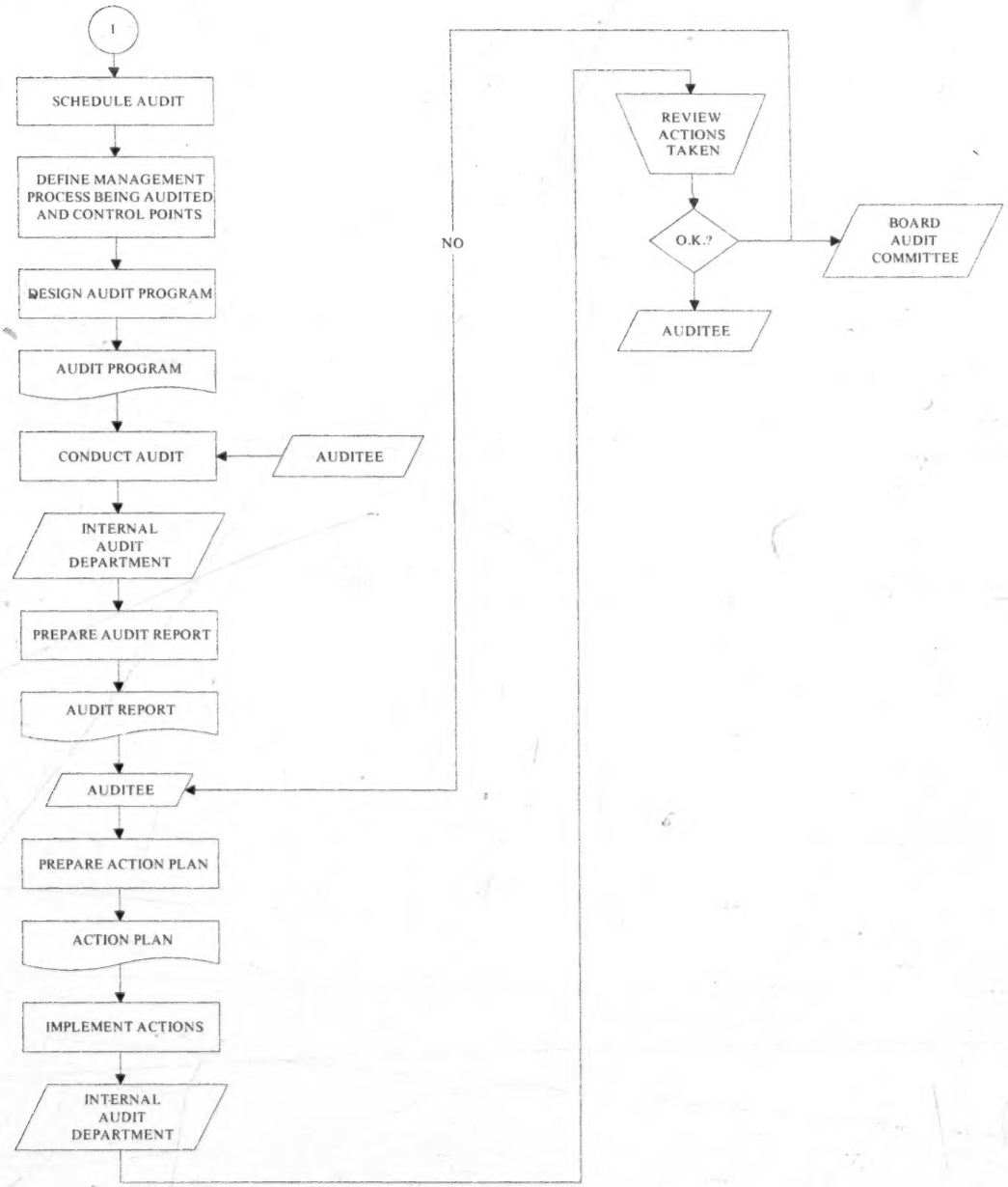

Figure A-12: Internal Audit Process Continued

Table A-13: Information Technology Services Results

What is the structure of this department?
Information Technology Services resides in the Finance and Administration business unit.
What services does this department offer?
This department supports the CSU. Groups within this department are: - Customer Systems - Infrastructure and Operations - Client Services - Integrated Systems - Engineering Systems - Corporate Document Services - Planning & Architecture - Cost Analysis & Security

Table A-14: Corporate Facilities Results

What is the structure of this department?
Corporate Facilities resides in the Finance and Administration business unit.
What services does this department offer?
This department is responsible for operating and maintaining existing administrative buildings and facilities. It is also involved in the planning/design/construction of new administrative buildings, capital improvements to existing structures, managing the central access control system and establishing office furnishings standards and the furniture acquisition process.

Table A-15: Corporate Finance & Administration Results

What is the structure of this department?
Corporate Finance and Administration is made up three primary groups: - Treasury & Business Analysis - Corporate Controller - Rates & Regulations
What services does this department offer?
Treasury & Business Analysis manages financing activities, cash and credit. It also consults on business case analyses, industry trends, and capital budgeting. The Corporate Controller is responsible for accounting activities and reporting of the CSU's financial functions. Rates & Regulations provides services regarding rates, regulations and risk management assistance.

Table A-16: Business Planning Results

How is business planning initiated?
Annually, top management develops a Corporate Strategic Business Plan (CSP). This plan is then cascaded throughout the organisation (business units to divisions to departments to sections). Each lower level develops their business plan based on the upper management level guidance.
What does the business plan consist of?
The CSP consists of - vision - mission - operating principles - goals and measures Each subsequent business plan also contains that areas vision, mission, and goals and measures. More detail in obtaining these goals and measures tends to be provided in lower level business plans.
How are business plans reviewed?
The CSP must gain final approval by the Board which essentially governs the CSU. Each of the lower level business plans go through similar review processes. The business planning process also requires the establishment of a measurement team. This team is responsible for collecting and analysing data that relates to the areas goals and measures. Quarterly business reviews are performed for each area's business plan. The output from these reviews may necessitate revisions to the area's business plan and subsequent strategies.
What does the CSU feel is the overall purpose and benefit from business planning?
The CSU believes business planning helps create focus throughout the organisation and also makes each area accountable for their performance and essentially the organisation as a whole. It is also believed that through this process, the organisation's quality process will be implemented – setting goals and measures and constantly trying to improve.
What aspects of the CSP are specifically related to quality management?
While all of the operating principles should essentially contribute to quality service, two of them are very specific to quality management: - The CSU proposes to measure performance outcomes, understand the causes of variation, and take appropriate actions. - The CSU advocates continuous improvement to meet the needs of internal and external customers. One of the CSU's goals is to provide customers with exceptional service. Among the measures related to this goal are: - retail rates - average outage time - average outage frequency - CEA customer service index

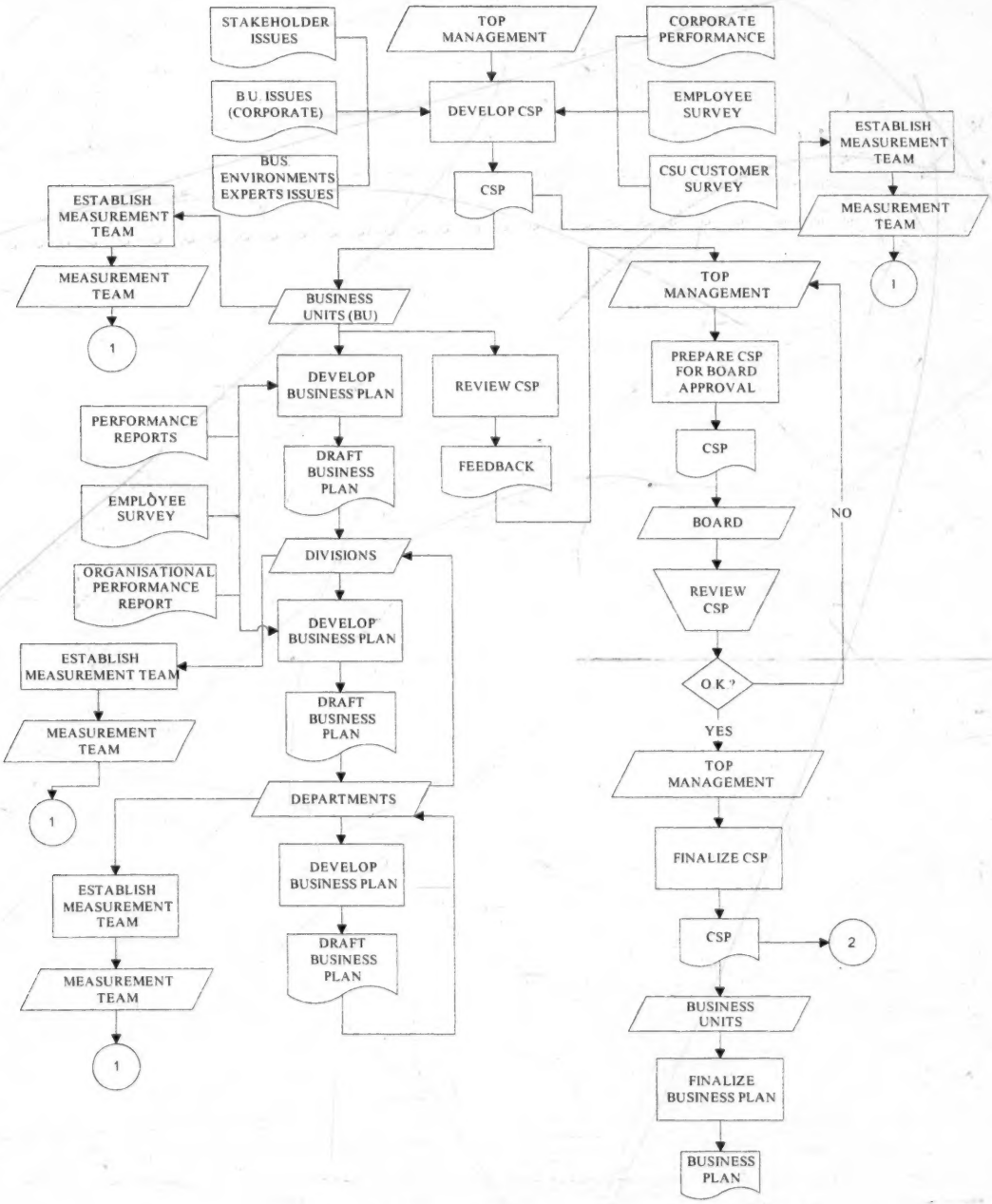

Figure A-16: Business Planning Process

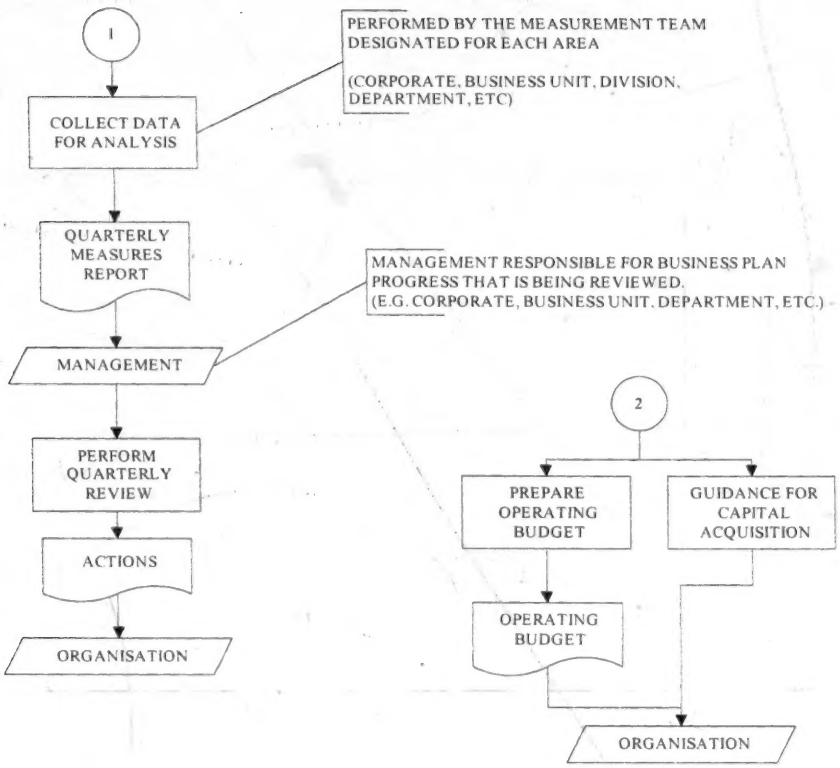

Figure A-16: Business Planning Process Continued

Appendix B: University of Alberta Application for Study Approval

B-1: **Application for Study Approval**

B-2: **Sample Questionnaire**

B-3: **Information Sheet**

B-4: **Consent Form**

University of Alberta
Faculty of Engineering
Research Ethics Board

B-1: Application for Study Approval

Student: Susan Hughes	**Faculty:** Stanislav Karapetrovic

Study Title:
Integration of Management Systems in an Electrical Utility: Quality Management

Study Description:

As a part of the research on her M.Sc. thesis regarding the integration of management systems in an electrical utility, Ms. Susan Hughes, an M.Sc. (Engineering Management) student in the Department of Mechanical Engineering, will perform a study on standardized quality management systems and the possibility of their integration within the existing management system framework at the corporate level. The study will be conducted from May to August 2003 and from May to August 2004 in the Corporate Planning Division of the Case Study Utility (CSU). The study consists of the following three phases.

- (1) Ms. Hughes performs an analysis of the current quality management system status at the corporate level of the CSU through a study of the relevant documentation and interviews with the employees from the Corporate Planning Division and the managers from other appropriate divisions of the company. To facilitate this analysis, Ms. Hughes designs a questionnaire that will be used in gathering information about the status of the quality management system and its compliance with the ISO 9001: 2000 standard. An example of a questionnaire that will be used is provided with this application.
- (2) Ms. Hughes administers the questionnaires in an interview setting. The number of interviewees is expected to be between fifteen and twenty. The interviewees are chosen from the upper-level managers in the company and the employees of the Corporate Planning Division of the company. The interviewees are selected on the basis of their knowledge and familiarity with the Quality Management System (QMS) and overall quality practices of the company, as well as organizational performance measurement in the quality domain. The interviewees are scheduled through a representative from the Corporate Planning Division.

Study Description (continued):

- (2) Informed consent is asked from all participants at the time of the interview. The participants are also informed that the participation in the study is completely voluntary and anonymous, and that the purpose of the study is to better understand the current organizational performance measurement and management processes, and to recommend the opportunities for improvement. The voluntary nature of the interview is assured by making a statement that the participant can refuse to participate at any time before or during the interview, and that such a decision will bear no negative consequences for the participant. The anonymity is assured by coding the interview data sheets with a non-personally identifiable code. Therefore, no individual-specific information gathered from the interviews will appear in the thesis and/or any reports provided to the company or being publicly available.
- (3) Ms. Hughes collects the data, provides an analysis of the current system and recommends an integrative model. The implementation of the proposed model is outside of the scope of this study.

Study Benefits:

This study is aimed at improving the integration of management systems in a non-traditional (non-manufacturing) setting. The expected benefits for the company include an improved understanding of the current status of the quality management system, an exploration of existing and potential linkages among separate management systems, provision of operational models that can be used to simulate and measure performance, and the illustration of the potential benefits of implementing integrated management systems. The researchers benefit from the development of a new integrated management system model for electrical utilities, focusing on performance measurement, and the ability to analyze the proposed model in a real-life setting.

Study Risks:

No specific risks to people are expected from this research study.

Ethical Considerations:

Informed consent:
The consent will be asked from all participants before the interview, by reading the statement enclosed in B-3 of this application, and by signing the consent form in B-4. Participation in the study is completely voluntary, and anonymity is assured. The provision of answers to the questions in an interview or the signature on the consent form will constitute participant consent.

Anonymity:
The anonymity is assured by coding the interview data sheets with a non-personally identifiable code. The code sheet will be kept in a locked drawer accessible to Ms. Hughes only for the duration of the study, and then transferred to the University of Alberta, where it will be kept locked in Dr. Karapetrovic's office for a period of one year after the last publication regarding this study has been published.

Other aspects:
No deception and/or concealment will be deployed in this research. No potentially hazardous equipment and/or material will be used in this research.

B-2: Sample Questionnaire

Susan Hughes - Research Questionnaire:

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1. What is the structure of this business unit? What are the main services provided, customers served; and requirements of these customers? How are the requirements of the business unit determined?
2. What work, if any, has been done in investigating how well the organization conforms to ISO 9001:2000 standards?
3. What is the history of quality practices in this business unit and are there any examples of initiatives that have been undertaken? How were the timelines and allocation of resources established? Were the timelines, allocated resources and support acceptable for the completion of these projects?
4. How is the commitment to quality communicated to employees? Are customer, regulatory, and statutory requirements communicated?
5. Has a quality policy been established? Is so, what is this policy and how is it reviewed and maintained?
6. How are quality objectives established and reviewed? How are responsibilities defined, resources allocated and timelines developed for deploying these objectives?
7. How are quality objectives communicated to employees? Does this communication show how these objectives are applicable to the work that each group performs?
8. What kind of emphasis and program is used to ensure competency in employees? Are clear levels of reporting defined and how do employees know what their job descriptions/duties are?
9. How is the effectiveness of the quality management system reviewed? Are reviews done at planned intervals, and if so, what inputs and methods of review are used?
10. How are quality measurement parameters developed? What are some examples of the quality measures that are monitored?
11. Upon review of quality management practices and measures, what actions are taken to achieve targets that were not reached and to allow for improvement? How is continuous improvement of processes and services promoted?
12. Are internal quality audits conducted in this business unit? If so, what is the purpose of these audits, how are they initiated, and are they performed in planned intervals?
13. How are customer complaints dealt with and are there any other methods for attaining customer feedback? What other outside influences are considered when defining objectives, goals, and targets?

B-3: Information Sheet

Study Title:
Integration of Management Systems in an Electrical Utility: Quality Management

Research Investigators:

Susan Hughes
Corporate Planning Division
Case Study Utility

Stanislav (Stan) Karapetrovic
Department of Mechanical Engineering
University of Alberta
T6G 2G8 Edmonton, Alberta
S.Karapetrovic@ualberta.ca
(780) 492-9734

Research Description:

Hello. My name is Susan Hughes. I am conducting a study on how to use quality management systems and related auditing frameworks in the integration of function-specific management systems in an electrical utility. This research is a part of my master of science in engineering management work in the Department of Mechanical Engineering at the University of Alberta. The purpose of the study is to improve the planning and reporting of the quality management system and to examine the possibility of the integration of this system with other management systems. As a part of this study, I will be conducting interviews to better understand the current measurement and management processes within the CSU, as they pertain to quality management. The interviews will be conducted with the assistance of a structured questionnaire. You are under no obligation to participate in this study. The participation is completely voluntary. You can refuse to participate at any time before or during the interview. If you refuse to participate, any data collected from your interview will be destroyed immediately after your refusal to participate. If you decide to participate, the data sheets from the interview will be coded with a non-personally identifiable code. You will be asked to sign the consent form (back side). Your signature on the consent form will constitute your consent to participate in this study. Your name will not appear in any documents, reports, research papers or the thesis stemming from the interview. The code sheet will be kept in a locked drawer accessible to me only for the duration of the study (July to August 2003 and May to August 2004), and then transferred to the University of Alberta, where it will be kept locked in Dr. Karapetrovic's office for a period of one year after the last publication from this study has been published. If you have any questions regarding this study, please do not hesitate to contact me, or the study coordinator Dr. Stanislav Karapetrovic. Any questions regarding the ethical considerations in conjunction with this study should be directed to Dr. John Whittaker, Chair of the Faculty of Engineering Research Ethics Board, Department of Mechanical Engineering, University of Alberta, Edmonton, Alberta, T6G 2G8, John.Whittaker@ualberta.ca, (780) 492-4443.

B-4: Consent Form

Part 1 (to be completed by the Principal Investigator)

Title of Project: Integration of Management Systems: Quality Management

Principal Investigator(s): Susan Hughes and Stanislav Karapetrovic

Co-Investigator(s):

Include affiliation(s) and phone number(s):

Department of Mechanical Engineering, University of Alberta

T6G 2G8 Edmonton, AB (780) 492-9734

Part 2 (to be completed by the Research Participant)

Do you understand that you have been asked to be in a research study?	Yes	No
Have you read and received a copy of the attached Information Sheet	Yes	No
Do you understand the benefits and risks involved in taking part in this research study?	Yes	No
Have you had an opportunity to ask questions and discuss this study?	Yes	No
Do you understand that you are free to refuse to participate, or to withdraw from the study at any time, without consequence, and that your information will be withdrawn at your request?	Yes	No
Has the issue of confidentiality been explained to you? Do you understand who will have access to your information?	Yes	No

This study was explained to me by: _____

I agree to take part in this study:

_____	_____	_____
Signature of Research Participant	Date	Witness
_____		_____
Printed Name		Printed Name

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

_____	_____
Signature of Investigator or Designee	Date

THE INFORMATION SHEET MUST BE ATTACHED TO THIS CONSENT FORM AND A COPY OF BOTH THE FORM AND THE INFORMATION SHEET MUST BE LEFT WITH THE RESEARCH PARTICIPANT.

Appendix C: Flowchart Symbols

Table C-1: Flowchart Symbols

Table C-1: Flowchart Symbols

SYMBOL	DESCRIPTION
	INPUT/OUTPUT (e.g. customer, stakeholder)
	DOCUMENT
	NON-VALUE ADDING ACTIVITY (e.g. inspection)
	CONTINUE (e.g. connector to next page)
	VALUE-ADDING ACTIVITY (e.g. operation)
	MATERIAL/ RESOURCE
	DECISION
	COMMENT

Appendix D: ISO 9001:2000 Case Study Results

Table D-1: Top Management

Table D-2: Marketing & Customer Service

Table D-3: Design Engineering

Table D-4: Production

Table D-5: Procurement

Table D-6: Human Resources

Table D-7: Accounting & Finance

Table D-8: General Services

Table D-9: QMS Administration

Table D-1: Top Management Results

ISO 9001:2000 TMM	CSU Activities
Establishment/maintenance of quality objectives	Within the CSU's corporate strategic plan (CSP) are operating principles and goals that relate to quality. The quality-related areas identified are paraphrased below: - *Operating principle:* Measure performance outcomes, understand causes of variation and take appropriate actions. - *Operating principle*: Practise continuous improvement to meet the needs of internal and external customers - *Goal:* Provide customers with exceptional value. Related measures include retail rates, average outage time, average outage frequency, CEA customer satisfaction index These principles and goals undergo a quarterly review and the CSP is drafted annually. Based on the CSP, lower management levels draft their own business plans. This is one communication channel for top management to promote quality. Inputs to the CSP include stakeholder issues, business unit issues, business environment experts issues, corporate performance, annual employee survey results, quarterly CSU customer survey.
Formulation/maintenance of quality policy	No specific quality policy is drafted by top management. However, the CSU operates under a vision and a mission that are heavily tied to quality management. - To paraphrase the CSU's vision, it is striving to be the best utility in North America and believes this can be accomplished through effectively managing safety, retail rates, reliability, customer satisfaction, and the environment. - To paraphrase the CSU's mission, it is striving to provide a continual electricity supply for its jurisdiction. It wants to economically and efficiently develop generation, transmission, distribution, supply, and end-use processes.
Initiation/supervision of quality program	No official quality program exists in the CSU. However, top management believes quality is promoted through the business planning and review process.
Appointment of management representative and appropriate area leaders	No official management representative has been appointed to administrate the CSU's overall quality program. Some lower levels of the organisation however have appointed representatives to administrate quality improvement activities related to their area.

Table D-1: Top Management Results Continued

ISO 9001:2000 TMM	CSU Activities
Auditing for compliance	- The organisation has not initiated ISO 9000 registration, so no official ISO audits occur. - An internal audit department exists that regularly audits management processes throughout the CSU. It operates from an annual audit plan that is developed from the CSP. - Certain areas of the organisation that must comply with government and industry standards are audited regularly. For example, the Meter Shop department of the Customer Service and Marketing business unit is annually audited by Measurement Canada to maintain its certification. As a support to this audit, monthly internal audits of the area are performed to help maintain compliance.
Provision of resources for implementation	No official resources have been provided for the QMS since it is informal. Additional resources must be approved by top management and approval is based on budget availability and justification for the creation of a new position.
Assessment and improvement of organisation	The prime method of assessing the CSU's performance is done through quarterly reviews, based on the CSP and lower level business plans. Review of the CSU's goals and related measures form the basis for identifying possible areas and actions for improvement.

Table D-2: Marketing & Customer Service Results

ISO 9001:2000 TMM	CSU Activities
Establishment of processes & documentation	Process for all customer service operations have bees established and documented (e.g. trouble call response system). This documentation is regularly reviewed and revised.
Administration of customer satisfaction survey and market research	- A quarterly Customer Satisfaction Study is performed to gain feedback from customers regarding the organisation as a whole. - Other departments sometimes gain approval to perform their own customer surveys. For example, the customer contact centre conducted a customer satisfaction survey of their own specific operations. - Marketing areas gain feedback from focus groups and other mediums for promotions and electricity conservation initiatives that are of interest to customers.
Determination of product specifications	Product specifications (electricity itself) is heavily regulated and not dictated by customers. However, customers can specify the rates they wish to pay, availability of electricity and the supporting services that the CSU supplies/
Advertising, promotion of products/services	The CSU has departments dedicated to advertising and promoting the CSU. Such promotion includes its electricity conservation program which offers various initiatives such as replacement of old Christmas lights with more environmentally conscious brands.
Personnel training	- This department has human resource representation and follows the corporate guidelines for employee training and development. - For specific occupations, training programs are established. For example, Meter Shop technicians go through a very structured training program.
Customer service	This department offers is the main interface with customers. Services include the activation and cancellation of accounts, meter reading to the handling of inquiries and complaints. Also, all CSU promotions and advertising is done through this department.
Assessment and improvement of processes	This area has numerous quality improvement initiatives in place and are primarily based on the area's business plan. Examples: Customer Contact Centre performs Manual Call Monitoring and has a team of employees designated to deal with actions stemming from Employee Survey results.

Table D-3: Design Engineering Results

(Generation – Electrical Engineering Design)

ISO 9001:2000 TMM	CSU Activities
Establishment of processes & documentation	- Clear processes exist to start projects, with the asset owner the key initiator. Project approval is tied in closely with the budget. - Clear divisions for the various stages of the overall process have been established. These stages are business enterprise planning, project planning, implementation, and closure.
Research of quality aspects/requirements	- Many of the CSU engineering designs have to be in strict compliance with industry and governmental guidelines. - The asset owner is responsible to gaining approval for the project, with feedback from design engineering (capital project justification). - When design engineering defines the scope of the project, it requires final approval from the asset owner. In essence, the asset owner should be very aware of the quality aspects/requirements. - Care is taken to address all deficiencies and maintain accurate documentation of how the project construction was finalised.
Technical detail development and planning	Project plans are assembled and go through a detailed scope planning process. Following approval from the asset owner, the engineering group designs the requested system and issues specifications.
Review, verification, and validation of design	- Following the initial engineering design, specifications are presented to the asset owner for approval and sign-off. - The progress of project teams is also monitored. For large projects, the review is generally done on a reactive basis. For smaller, more discipline specific projects, reviews are generally performed monthly.
Control of design modifications/updates	- All engineering drawings, Operation and Maintenance manuals, and commissioning procedures are revision controlled and stored in a central document controlled database. - As-built drawings are provided by the construction group and updated by engineering design during the closure stage of the project. - A deficiencies report is compiled following commissioning – design engineering is responsible for addressing all deficiencies and are completed based on criticality.

Table D-3: Design Engineering Results Continued

ISO 9001:2000 TMM	CSU Activities
Personnel training	- This department has human resource representation and follows the corporate guidelines for employee training and development. - This department participates in the E.I.T. program, which involves two years of exposure to the company for new graduate engineers. Professional development is encouraged and tracked. E.I.T.'s are also assigned mentors and their progress is reviewed regularly. Progression towards professional status is required.
Determination of quality specifications and resource requirements	- Resource requirements are established for the project planning, implementation, and closure stages of the project. - Commissioning and Operation and Maintenance manuals detail specifications relating to quality for both the operation of the designed system.
Assessment and improvement of processes	- A large component of project closure is contributions to the "Lessons Learned" database. This database serves as a reference for the design engineering group and highlights areas of concern that should receive attention in future projects. - The asset owner provides feedback regarding the designed system first year of operation. - This area develops and maintains a business plan which lays out its vision, mission, goals and measures.

Table D-4: Production Results

(Customer Service & Marketing – Meter Shop)

ISO 9001:2000 TMM	CSU

Establishment of process & documentation, including production plans, inspection plans, test plans, identification and traceability	- All process involved in servicing meters are documented and maintained.
	- Production, inspection, and test plans are documented and maintained.
	- Identification and traceability systems are in place.
	  - Gas meters are tracked scanned and electronically tracked.
	  - Electric meters are manually tracked and areas for each process step are clearly defined on the production floor.

Clarification/validation of quality aspects of design	Care is taken in designing the meter servicing process to ensure the integrity of the meters is maintained. The program is regularly evaluated.
Determination of technical/human resources	This department has human resource representation and follows the corporate guidelines for employee training and development.
Personnel training	- Job positions are classified, with each classification assigned a list of responsibilities and technical tasks. - A training program exists and records for each employee are kept. Once a certain task/responsibility has been mastered, both the trainer and employee sign off and this information is recorded.
Product and customer property preservation	Meters are inspected when received and when service is complete. Action and care is taken to preserve the quality of the product while the responsibility of the meter shop.
Assessment/establishment of process capability	- All process measurements are recorded and tracked and process are regularly analysed. - Program in internally audited monthly.
Control of monitoring and measuring devices	- Each piece of equipment has its own maintenance schedule, which is documented and tracked. - Equipment that does not conform is quarantined and necessary action is taken.

Table D-4: Production Results Continued

ISO 9001:2000 TMM	CSU Activities
Control of nonconforming product	- A Corrective Action Request (CAR) program exists and is administered by the quality assurance supervisors – gas and electric. - Employees are empowered to note issues that are causing or have the potential to cause problems. Fill out CAR forms and present them to QA supervisors. - QA supervisors are responsible for working with employees and other affected personnel to develop corrective actions and also if applicable, preventive actions to address the problem. The actions taken, dates, and employees involved are tracked and records for all CAR's are maintained.

Assessment and improvement of processes	- Aside from the CAR program, supervisors and management are supportive of the quality program and promote awareness throughout the department. A component of weekly staff meetings is the incorporation of suggestions for improvement.
	- All suggestions put forward are followed up on and the department also provides a suggestion box where employees can submit comments anonymously.
	- Behaviour Based Safety System provides opportunities for continuous improvement. Employees are required to conduct a safety inspection of a fellow employee once every two weeks. The inspection is performed against a prescribed list of criteria, with all observations noted, recorded, and followed up on. Some of these observations relate to quality and opportunities for improvement.
	- An annual internal customer satisfaction survey is performed to assist in learning customer perceptions and identifying opportunities for improvement. The three key areas identified by customers involve:
	  - ensuring meters are available
	  - availability of meter shop staff when contact is necessary
	  - availability and competency of meter staff to address questions/problems

Table D-5: Procurement Results

ISO 9001:2000 TMM	CSU
Establishment of processes & documentation	- Corporate policies have been developed to provide guidelines for corporate purchasing activities. - All purchasing transactions are tracked through SAP
Development of specifications to measure purchased product quality	The purchasing department works with design engineering groups to develop specifications to measure incoming product quality. Raw material is classified into three groups, depending on its criticality. - *Class A*: critical to final product a. Specification stringent b. Vendors often pre-qualified (i.e. may have to have ISO 9001:2000 certification or be able to demonstrate compliance) c. Prior to delivery, product may have to undergo tests with CSU inspector to witness test - *Class B:* middle level of criticality or commonly purchased good a. Listing of pre-approved suppliers/parts = **M**aterial **E**quipment **D**ata Sheets b. Suppliers undergo tests, provide samples, etc. for qualification c. Lists criteria for incoming inspection d. Rejected material returned to vendor. If persistent problem, management becomes involved to resolve issue - *Class C:* smaller value items. These item are generally used for maintenance, repair, and operation. Can likely be purchased with corporate credit card.
Clarification of requisitions	- For high criticality parts (Class A), there is strong communication between Purchasing and Design Engineering – requisitions are clarified. - For middle criticality parts, communication is not always as strong. Purchasing sometimes obtains parts not meeting exact technical specifications. The purchased material then will require rework or replacement.

Table D-5: Procurement Results Continued

ISO 9001:2000 TMM	CSU Activities
Selection/negotiation with qualified suppliers	- Alliances have been formed with some vendors. These alliances are for a set period of time, with the CSU guaranteeing to buy a set quantity of goods over the agreement – vendor given a forecast. Primarily done when dealing directly with vendor; does not work as well when goods are moved through a distributor
Training of personnel	This department has human resource representation and follows the corporate guidelines for employee training and development.
Verification of quality of deliverables	With the help of design engineering, specifications for incoming inspection have been developed. There is a quality control function established in this department for inspection purposes.
Assessment/recording of supplier performance	The CSU looks for vendor improvements and sharing of information. One area of focus is for vendors to do most of the inspection themselves, therefore cutting down on incoming inspection costs.
Product preservation	Care is taken to ensure product preservation at all times – from receiving to use.
Assessment and improvement of processes	- This area develops and maintains a business plan which lays out its vision, mission, goals and measures. - Suppliers are encouraged to demonstrate quality improvement and to form strong relationships with the CSU.

Table D-6: Human Resources Results

ISO 9001:2000 TMM	CSU Activities
Establishment of processes & documentation	- Corporate policies have been developed to provide guidelines for corporate human resources activities. Processes exist for both internal and external hiring. - All job descriptions are classified and maintained. - Database tracks applications to open positions. - For E.I.T. program, a database tracks what training each of the program participants receives.
Determination of staff requirements and qualifications	- Individual areas do an annual forecast of required personnel (with justification). This forecast filters up through management, with the final decision made by the President. Decisions tied closely with budget provided by Corporate Accounting
Preparation of job descriptions	- Job descriptions and classifications are regularly reviewed. - When posting an open position, the hiring supervisor reviews the job description for accuracy, applicability and competencies.
Provision of conditions conducive to good workmanship	Human resources encourages employee development. It makes different training programs available to help employees develop competencies that will contribute to good workmanship.
Training, education, and motivation of personnel to achieve organisation's quality objectives	- Through the encouragement of employee development, it is believed employees with be motivated to achieve the organisation's quality objectives. - Numerous opportunities are available for further education and training and are generally highlighted in each employees personal development plan. - Training programs for areas such as E.I.T.'s, commerce, and field positions assist in helping new employees develop.
Assessment and improvement of processes	This area develops and maintains a business plan which lays out its vision, mission, goals and measures.

Table D-7: Accounting & Finance Results

ISO 9001:2000 TMM	CSU Activities
Establishment of processes & documentation	- Corporate policies have been developed to provide guidelines for corporate accounting and finance activities. - Maintain budgets which are used as an input to planning processes
Provide guidance and control for available resources, budgets	Accounting and finance representatives exist throughout the CSU to provide guidance on financial matters.
Training of personnel	- This department has human resource representation and follows the corporate guidelines for employee training and development. - This department also participates in a Commerce training program. This program is an entry point for Commerce graduates and involves rotation through different departments in the CSU to assist in development and organisational exposure.
Assessment and improvement of processes	This area develops and maintains a business plan which lays out its vision, mission, goals and measures.

Table D-8: General Services Results

ISO 9001:2000 TMM	CSU Activities
Establishment of processes & documentation	- Corporate policies have been developed to provide guidelines for information technology and corporate facilities processes. - Information technology documents and maintains much of their operations.
Secure safety of facilities and workplaces	The CSU has a formal safety management system.
Assessment and control of environmental conditions	The CSU has a formal environmental management system. Corporate Facilities is responsible for operating and maintaining buildings and facilities. Information technology is responsible for operating and maintaining technology infrastructure.
Training of personnel	This department has human resource representation and follows the corporate guidelines for employee training and development.
Assessment and improvement of processes	This area develops and maintains a business plan which lays out its vision, mission, goals and measures.

Table D-9: QMS Administration Results

ISO 9001:2000 TMM	CSU Activities
Establishment of processes & documentation	- Guidelines and manuals for quality training are established and maintained. - No formal quality management processes established or documented
Preparation and maintenance of quality manual	There is no formal quality manual.
Organisation and guidance of quality program	- There is no formal quality program. - Public Affairs is the main conduit for top management to promote quality awareness throughout the organisation. This is mainly done through the publication of the CSP and maintenance of the CSU intranet.
Initiation and coordination of quality improvement programs	- Initiated quality movement around 1995. Original goal was to have quality improvement integrated in organisation in 3 years – did not happen - Trained Performance Improvement Advisors (PIA's). These individuals were then equipped to spread this knowledge throughout organisation. 100 PIA's trained. - Training is fine – people develop the knowledge and expertise. However, in some areas leaders offer very little support and not much has been done. Support is not uniform throughout organisation, although seeing improvement over time
Review and audit of quality program	- No formal audit of the quality program is performed since the program itself is not formalised. - Internal audit department assesses management processes throughout the CSU. - Quarterly reviews assess the progress made on achieving business plan goals and targets.
Assessment and improvement of processes	- Quality improvement initiatives develop from area business plans. Managers/leaders of the area determine what projects will contribute to the success of their area in meeting goals. - Tend to focus on short term gains than long term goals - Corporate improvement is driven through the CSP.

Appendix E: ISO 10002:2004 Sections and Guidelines

Table E-1: ISO 10002:2004 Sections and Corresponding Guidelines

Table E-1: ISO 10002:2004 Sections and Corresponding Guidelines
(adapted from ISO 10002:2004)

ISO 1002:2004 Section	Section Guidelines
4. Guiding Principles	4.1 General
	4.2 Visibility
	4.3 Accessibility
	4.4 Responsiveness
	4.5 Objectivity
	4.6 Charges
	4.7 Confidentiality
	4.8 Customer-focused approach
	4.9 Accountability
	4.10 Continual improvement
5. Complaints-handling framework	5.1 Commitment
	5.2 Policy
	5.3 Responsibility and authority
6. Planning and design	6.1 General
	6.2 Objectives
	6.3 Activities
	6.4 Resources
7. Operation of complaints-handling process	7.1 Communication
	7.2 Receipt of complaint
	7.3 Tracking of complaint
	7.4 Acknowledgement of complaint
	7.5 Initial assessment of complaint
	7.6 Investigation of complaint
	7.7 Response to complaints
	7.8 Communicating the decision
	7.9 Closing the complaint
8. Maintenance and improvement	8.1 Collection of information
	8.2 Analysis and evaluation of complaints
	8.3 Satisfaction with the complaints-handling process
	8.4 Monitoring of the complaints-handling process
	8.5 Auditing of the complaints-handling process
	8.6. Management review of the complaints-handling process
	8.7 Continual improvement

Appendix F: Complaint Template

Table F-1: Complaint Template (from CSU Complaint Registry)

The following table illustrates the template used by the CSU to record complaint information and track its resolution.

Table F-1: Complaint Template

Complaint Number:	**Complaint Registered Date:**
Reported Via:	**Source:**
Entered by:	
Customer Surname/Stakeholder:	**First Name:**
Street Address:	**City or Town**
Postal Code:	
Mailing Address:	**Email Address:**
Phone: Residence:	**Business:**
Cellular:	**Fax:**
Acct. No.:	**Utility:** Electric or Gas
District:	**Area:**
Information Taken By:	**Employee No:**
Type of Complaint:	
Description of Complaint or Claim (Include Items Damaged) *Text*	
Date Any Damage Occurred:	
Investigation Required?: Yes/No **External to your Dept?:** Yes/No	
Person Responsible: **External Department:**	
Investigation Report *Text*	
Significant Incident Report #'s if applicable:	
Investigated by:	**Employee No:**
Please enter Date of Resolution:	
COMMENTS:	

THIS COMPLAINT WAS ACTIVE FOR # DAYS